THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XVII. No. 406—20th YEAR.] LONDON, MAY 12, 1868. [Subscription per Ann. { 15s. in Advance / 18s. Credit.] With SUPPLEMENT, Price 1s. 6d.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis by Dr. FYFE, M.D.:—
9746 cubic feet of gas per ton of coal.
26-candle gas.
13½ cwt. coke per ton of coal.
N.B.—Ramsay's Cannel most resembles the Marquis of Lothian's Cannel, but superior as to coke.
RAMSAY'S PATENT CONDENSED COKE,
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828.
FIRE-BRICK WORKS, established 1804.
FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire Clay.
The Fire Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article.
The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the works are the most extensive in the Kingdom.
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Patentees of the Standard Gasometers for the Government, and of the
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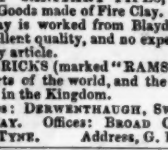
These Meters are warranted to measure correctly and not to vary, and have come into general use more rapidly than any Meters hitherto manufactured.
1862.
CLASSES X.  AND XXXI.
CLASS X.—*"For ingenuity, completeness, and efficiency of apparatus used in measuring gas, and for excellence of material and workmanship."*
CLASS XXXI.—*"For superiority of construction and workmanship."*
Particulars and lists of prices forwarded on application to Ranelagh Works, Ranelagh Road, Pimlico, LONDON, S.W.; 15, Market Street, MANCHESTER; or 127, Boulevard de Magenta, PARIS.

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BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,
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J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay are promptly executed at their Works as above.
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AND
STREET-LAMP
MANUFACTURERS,
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WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.
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Auchinheath, Lesmahago, March, 1868.

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JOURNAL OF GAS LIGHTING NEWSPAPER HALF-PENCE

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1862.

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NB A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches. 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

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NEAR
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THE BEST AND CHEAPEST
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All sizes, from ¼ in. to 4 in. diameter and upwards.
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INDIA-RUBBER BAGS for GAS-MAINS.
WASHERS for GAS and STEAM JOINTS.
VALVES (pure solid Rubber) for STEAM-ENGINES.
PACKING (Elastic) for STEAM-ENGINES.
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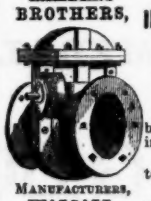

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THE

UNIVERSAL EXHIBITION OF PARIS,

1867.

SILVER MEDAL.

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DRY GAS-METERS,

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MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

NOTICES.

The subscription to the JOURNAL is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders should be made payable at the Money-Order Office, London, to William B. King, 11, Bolt Court, Fleet Street, by whom the business department of the JOURNAL is conducted.

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All communications for the Editor to be addressed, "No. 42, Parliament Street, Westminster;" and all remittances for subscriptions or orders for advertisements to the Publisher, No. 11, Bolt Court Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MAY 12, 1868.

Notes upon Passing Events.

THE Marquis of Salisbury, in his new office as chairman of the Great Eastern Railway, pronounced a judgment, in his opening speech to the shareholders, worth the consideration of wild railway reformers, when he said that the Great Eastern had not been reduced to its present insolvent position by any enormous robberies, but by the mistaken idea, worked out by competition, that the traffic of an agricultural district could be developed in the same proportion as that of a manufacturing or a mining district. A manufacturer can turn over his capital many times in a year, and each time requires cheap conveyance to bring the raw material and take away the finished goods. A mining district, as long as it is workable, can send away stuff every day, but agricultural traffic is limited by the seasons; its consumption bears a proportion to the wages of its labourers, and no possible reduction of fares will send agricultural passengers from constant occupation, or increase the merchandise beyond the natural supplies of produce. When a purely agricultural district has laid in its supplies of coal and groceries, and sent away its grain, beef, mutton, and pork, alive or dead, there is not much more to be done; although the difference between a district with and without railways is often the difference between growing for mere home consumption and a great multiplication for the purpose of exportation. For these reasons all calculations of increase in the railway traffic of purely agricultural districts, based on a reduction of fares and rates, have very narrow limits. High charges are simply suicidal, but the reductions that would create an enormous trade in coals, or ore, or textile goods, would have no profitable result where grain and live stock are the only merchandise and the growers and feeders the only passengers. Railways have made coal-fields worth millions that were worth nothing when carts were the only available conveyances. We have no doubt that up to certain limits a reduction of fares and an amalgamation of lines would very much benefit Ireland, but except where mineral wealth can be developed, or a trading or fishing port opened safely, remuneration, not to say profits, must be sought in the cheap working of a few trains at moderate speeds daily. It is not by any extraordinary conjuring tricks that unprofitable lines are to be made profitable, but by reducing the accommodation to the wants of the district, instead of trying to bring the conveyance of farmers and their labourers up to the manufacturing standard. "There are," said an eminent engineer, the other day, in giving evidence before a committee, "scores of railways on which the power of a dray-horse is put "to draw a wheelbarrow, and that can never pay." One of the members of the Metropolitan Board, in a discussion about the District Railway, displayed a degree of ignorance not creditable, but common to people of his class, when he stated, as a proof of the superiority of the management of French railways, that one of them paid 17 per cent. He ought to have known that this large dividend is earned by running the fewest number of trains with the largest possible loads, the least possible station accommodation, and no branch lines, except those made at the risk of the Imperial Government. It is rather odd that those who are most poetical in their plans for increasing daily traffic by large reductions of fare are the most opposed to excursion trains. Now, excursion trains are an English invention for meeting the wants of a large industrious population that can only afford time and money for travelling on Sundays and on national holidays. Of course, if ill-arranged, excursion carriages may become slaughter-houses; nevertheless, they are a supplement to savings banks and penny postage. They do much to remove provincial prejudices, and to educate by travel classes who have not much time for reading.

The Metropolitan Board, in their discussions with the directors of the Metropolitan District Railway, seem to keep too closely in view the commercial character of that undertaking. But although the railway company has been founded on the principle of making a profit, it should not be forgotten that the railway under the embankment running to the City will be a work of great public advantage. The embankment will be very pleasant and useful without the railway, but it will not be complete without it. The *Times* has been against the railway company, who stand in the mortifying position of people who are obliged to make excuses for not punctually performing their engagements. Yet, after all, it is more a subject for forbearance than indignation. Every possible assistance that can with propriety be given by the railway Board should be given—not for the sake of the feelings of the directors or the pockets of the shareholders, but for the convenience of the passengers, who would be at least as numerous under ground as above ground.

The opening of the Thames Embankment, on the south side, from Westminster to Lambeth, which looks so fine from the committee-rooms of the Houses of Parliament, induces us to again suggest the propriety of negotiating with the proper

authorities, the Archbishop or the Ecclesiastical Commissioners, for the public use of the small park attached to Lambeth Palace, now in the sole occupation of a few grimy cows by day and an army of cats by night. It was a shabby thing to take from the Archbishops their country retreat at Addington; but this piece of economy does not render it less advisable to give to the labouring population, and especially the children of Lambeth Marsh, a playground which the Archbishop's family never use, and which, if ornamentally arranged, would be a prettier landscape from the palace windows, even if alive with working boys and girls, than in its present dank and deserted condition. We hope some member of the Metropolitan Board will take this subject up in a proper spirit. It would suit Mr. Taylor, who was once the standing churchwarden of Lambeth. By a proper, we mean a conciliatory spirit, with a proposal to give reasonable compensation.

We are afraid there can be no doubt that the scheme for turning the sewage into the Thames is a failure—that is, that harm is done to the navigation of the river that was not contemplated, unless by a few whose protests had no weight. It is probable that the sewage alone would float away; but with the sewage comes a large quantity of sand, ground from the granite and Macadam of the metropolis by the wheels and iron-shod horses that are always at work. This sand is said to be worth more money than the sewage if it could be collected at the outfall. Whether or not that is possible we are not prepared to say. That, however, is a secondary part of the question. London cannot afford to let the Thames be stopped up by an artificial barrier of sand and sewage. The remedy is costly, but certain. If the commercial company fails to carry out its contract and lead the whole stream to the sands of Essex, the work must be done by metropolitan funds, with, if needful, temporary assistance from the national treasury. The nuisance must be abated, and there is every reason to believe, from recent experiments on a large scale, that it may be done without immediate loss and with eventual profit.

We give, in another place, the further discussion on Dr. Letheby's paper "On the Cholera Epidemic of 1866, and an "Examination of the Question whether the Water Supply had "any Connexion with the Disease." The result of the discussion is concisely summed up in the concluding words of Dr. Letheby's reply: "In this particular instance he was afraid "that the conclusion was formed before the investigation "began, and that it was come to simply from the fact that the "map of London had been taken by the Registrar-General, "and the outlines of the cholera field marked upon it. Certain "people finding the coincidence that the cholera was in the "district, and that the East London Water Company supplied "the water in that district, at once jumped at the conclusion "that the one stood to the other as cause and effect;" and he also said that, "If there had been the notion abroad that there "was some connexion between the propagation of cholera and "the supply of gas, there would have been the same coinci-"dence of facts with regard to the Commercial Gas Company "as there was with the East London Water Works Company "—with this additional fact, that the first case of cholera was "at the gas company's works!" Dr. Thuddichum is one of those learned and zealous philosophers who allow their admiration for an ingenious theory to upset the balance of mind needful for collecting evidence. His simplicity may be judged from the circumstance that he quotes the reports of the Board of Health on the cholera outbreak of 1848 as documents deserving serious attention. It is well known now that the able and unscrupulous sanitary detective who organised the investigation evolved his theories in his study, "from the depths of his "moral consciousness," and sent out obsequious subordinates to collect facts for the support of these theories, just as a keen solicitor would have collected evidence to prove a man sane or lunatic according to the retainer. In 1849 the Board of Health had planned an entirely new system of water supply to be executed and administered by a Board composed of Board of Health officials, and it was necessary to collect facts as sticks to beat the offending dogs of water companies. Since Dr. Thuddichum's comic proposal for making the sewage of London profitable by a patent water-closet of intricate construction for the special accommodation of the wants of the two sexes, we cannot treat any of his suggestions—notwithstanding his scientific reputation—seriously. Speaking of water, an eminent foreigner, an analytical chemist, was asked the other day his opinion of Dr. Frankland's new method of analyzing water. He answered, "It "is a microscopic analysis, and the practical use of it is "also microscopic!"

The news from Lancashire of the doings of the trades-union miners, and from Sheffield of the honours still paid to the assassin broker Broadhead, show that our trades unions have not yet realized the final act of their tyranny. In the report on needle-making at the Paris Exhibition, published by the Society of Arts, we find the following interesting account of how a profitable trade may be driven into the hands of foreigners:—

There are two methods of producing "steel London" needles in our English manufactures—one to use inferior material and employ corresponding workmanship; the other to class needles intended in the onset for best, but which have proved defective in one or other of the manufacturing stages, and unfitted them for best goods, as "steel London." If best needles could be prevented from being reduced to "steel London" in the processes, and the market supplied with cheap needles made expressly for the purpose, there is no reason why English manufacturers should not successfully compete with those of Germany. But, standing in the way of this, there are several slow, cumbrous, and uncertain processes; in the scouring-mill alone millions are annually reduced from best goods to "steel London," and even worse than that will sometimes pass for that quality which up to this stage have cost more than inferior needles should do when finished.

The "hardening," too, is another uncertain process; but, judging from results, it is better, though slower, than the German system, yet still open to much improvement. It is on the combined success of these two processes —"hardening" and "scouring"—that the temper of the needle depends, and which, from a combination of circumstances, too frequently fails. The result is, the "scourer" blames the "hardener" for leaving them too low; the hardener blames the scourer for over weighting, and thereby over heating them and reducing the temper; the master blames one or the other—sometimes both; and there the matter ends, in loss and failure. And by these bungling means we keep plodding on in constant hot water, and are, in this particular instance, as primitive as when, generations back, our forefathers hammered them into shape, one at a time, by hand labour. *The Germans, on the other hand, employ machinery successfully for many processes of which we know little or nothing.* It is to them we are indebted for what we know of the "pointing"-machine, known to be a success, and by means of which all their needles are pointed; and this, too, in a country where labour is cheaper than it is in England. George Printz, one of the German exhibitors, has obtained a gold medal for "scouring" and other machinery now in use in most of their needle-mills, with which they claim to scour more needles by four-fifths in 40 hours than our system will in seven days; and, if it is true what they assert, they avoid the danger of over heating, and thereby spoiling the temper of the needles. They have a machine for "cutting," which leaves the wires straight without the aid of fire, so that the rubbing process is altogether dispensed with; and also a "blueing"-machine, worked by two girls, doing the work which in our system would employ five women. "Tempering" and "cheek-filing" are also done by means of machinery.

Experience has doubtless made many of our manufacturers cautious in the introduction of machinery, as, in the memory of many living, it involved almost martyrdom. When "stamping" was introduced, about forty years back, it resulted in a riot (1830), and the stamps being destroyed by excited and infuriated handworkers. They are now adopted in every manufactory, and incalculable benefit has been the result. Again, in 1840, "hardening" in oil was introduced, by Mr. Joseph Turner, to supersede the old water "hardening," which "crooked" the needles, and necessitated every needle being hand-straightened—a slow work, sufficient in itself to "block up" the trade. For this he was, after repeated mobbings, indignation meetings, and insults, compelled to leave the town at considerable loss and inconvenience, returning in a few years to find, as with the stamps, his method introduced into most of the manufactories. A "pointing"-machine was next introduced by Mr. J. Chambers, which resulted in the machine being broken to pieces by the "pointers"—Mr. Chambers striking the first blow with a hammer, which he handed to the bystanders to complete the work of destruction—not because the machine was a failure, but that the opposition was too much for him. It was thought by those who were concerned in the breaking up of the machine to be a great victory on their part, and the excitement was at a fearful height. The following is a sample of the doggerel sung about the streets on the occasion, and is given here to show how strong was the feeling against machinery:—

"It was on the 24th of June, in eighteen hundred and forty-four,
The pointers brave in union joined to prevent their wages from sinking lower;
A machine then, at a certain shop, for pointing needles was well made,
Says the pointer, 'We must make it stop, or it will be the ruin of all our trade.'
And in that great and glorious day these brave lads met to make some rules,
And such manly sense did they display as plainly showed they were no fools."

A remnant of the old feeling still exists, but it is fast giving way to the growing intelligence of the times. Messrs. S. Thomas and Sons are now pointing needles by the aid of machinery without any apparent opposition. It is quite plain that while our manufacturers have been depending on the reputations, making little or no progress by the introduction and the application of machinery, our great rivals, the Germans, have made rapid advances in this direction.

Much has been said and written lately on the necessity of encouraging technical education in this country. The valuable reports from which we have quoted the account of German needle-making contain a description of a purely technical school established at Besançon, which occupies in France the position that Coventry and Clerkenwell do in England:—

This school is founded to secure the professional education of young people who intend devoting themselves to the art of watchmaking. The city of Besançon is the principal seat of the manufacture of watches in France. The manufacturers of this city almost exclusively supply the French market, as, of 378,498 watches sold in France in 1865, Besançon supplied 296,012, or nearly four-fifths of the whole number.

The school has for its object thoroughly to teach children the trade they intend to follow—to supply, in fact, the notorious deficiencies of an actual apprenticeship. The object this school is now carrying out on a large scale is to offer to young watchmakers an opportunity of constant comparison of

the theory of watchmaking with the results at which they arrive practically. The regular time for this practial and theoretical course is three years. The classes are held in a large building belonging to the city, the situation of which is all that could be desired. The classes are under the management of a director, who carefully sees that each branch of study is diligently followed out. The teaching is divided in the following manner:—

First Year (Third Division).

Practical Teaching.—Filing, turning, hardening, and tempering metal; perfecting small tools for doing first halves, and finishing; doing first halves of the ordinary sizes.

Theoretical Teaching.—Revision of early education; arithmetic, mensuration, geography, mechanical drawing, general principles; making the more simple tools and machines employed in watchmaking.

Second Year (Second Division).

Practical Teaching.—Doing first halves of various sizes; pivoting and making the different parts of a cylinder escapement.

Theoretical Teaching.—Studying style, geography, arithmetic, elementary geometry and its application; mechanical drawing, geometrical models, models of tools and machines used in watchmaking; designs of the different parts of a watch.

Third Year (First Division).

Practical Teaching.—Constructing and planting the escapement; examining and regulating.

Theoretical Teaching.—Course of mechanics; ideas of industrial chemistry, cosmography, commercial book-keeping, and general geography; mechanical drawing; study of various cut wheels, models of escapements, and designing watch movements for the model.

The theoretical lectures are given in each division every day, from seven till nine o'clock in the morning, Thursday excepted.

The work hours are from nine till noon, and from half-past one till five.

Drawing lessons are given in each division on Mondays, Tuesdays, and Fridays, from five till seven o'clock in the evening.

The course of commercial book-keeping and general geography, for the first division, is held every Wednesday from five till seven in the evening.

On Saturday the director examines the pupils in the work of the week, so as to note step by step the progress made.

In addition to the instruction given in the school, the pupils are taken from time to time to the different manufactories in the neighbourhood, so that they may become familiarized with the various combinations and applications of machinery, and also to different workshops where the several parts of a watch are made. The knowledge which they thus acquire of the methods used in the actual process of manufacture, and which can only be gained in the workshops themselves, completes the education indispensable to a thorough knowledge of watchmaking.

The school is visited each week by two members of the board of directors, composed of the most skilled men in the trade, who take note of the quality of the work done, as well as of the progress of the pupils.

At the expiration of each scholastic year the pupils are subjected to a general examination, at the end of which prizes are awarded to the most deserving pupils. The distribution of these prizes takes place in public, under the direction of the mayor.

This distribution is preceded and followed by a public exhibition of the productions of the manual labour of the students, and the designs executed by them during the year. The vacation begins on the 1st of September, and continues during that month.

The conditions of admission into the school are as follows:—

The school for watchmaking receives any young people, without distinction as to country or nationality. To be received into the school, the pupils must be able to read and write fluently, and know the four rules of arithmetic. They are examined before a special jury before being admitted.

The admission of the new pupils takes place at the commencement of the course—that is, on the 1st of October every year; but candidates can be admitted at any time of the year if they are pronounced by the jury of examination competent to follow the courses of the school. The demands for admission must be addressed to the mayor of Besançon by the parents or tutors of the candidate, with the following certificates:—

1. The day of the birth of the candidate, showing that he was fourteen years old before the 1st of January of the year in the course of which he presents himself.

2. A certificate of good conduct, delivered to the father or tutor of the candidate by the mayor where he resides.

3. An engagement, written by themselves, on stamped paper, certified by the mayor of the town, to pay quarterly, and in advance, to the pay office of the principal receiver at Besançon, the school fees, fixed at 200 francs, per annum; so that the first outlay of 40 francs for furnishing tools should remain the property of the pupil.

4. A doctor's certificate, stating that the candidate has been vaccinated with success, or that he has had the small-pox, and that he has no tendency to hereditary disease.

If this school is really useful, surely there must be enough public spirit in Warwickshire to establish a similar institution in Coventry.

Circular to Gas Companies.

The metropolis gas contest appears to have resolved itself into a question of strategy, instead of being the fair open fight on avowed and settled principles on which such struggles are usually conducted. On the first day that the committee met to consider the Bills before them the London Corporation Bill was proceeded with, though it might have been assumed that as the Metropolis Gas Bill included within its scope the City and all other parts of London, it would have been first considered; but the committee seemed to have determined to adopt that course, as it would best enable them to carry into effect the resolutions agreed to last year. Though two of the five members were new to the inquiry, they had been, as Mr. Cardwell stated, "perfectly well informed of what had taken "place," and the proceedings were conducted as if the committee consisted altogether of the same members. Mr. O'Malley opened the case for the promoters of the Corporation Bill. He contended that the Metropolis Gas Act of 1860 had given great advantages to the companies, to whom it secured a monopoly of the supply, but that it had been of no benefit to the public. He misrepresented, in several particulars, what had been the effect of that Act, asserting, for instance, that shortly after it passed all the metropolitan gas companies had raised the price from 4s. per 1000 feet to 4s. 6d.; and he proceeded to state, and afterwards called witnesses to prove, that the Corporation would be able to manufacture and supply gas of 18-candle illuminating power for 3s. per 1000 feet, though they would take power under the Bill to charge 3s. 6d., on the assumption that the Corporation would be allowed to borrow the money necessary to construct the works at the rate of 6 per cent. The cost of works of sufficient extent to supply the whole of the City was estimated not to exceed £500,000. The principal witnesses called in support of the Bill were Mr. Haywood, the City engineer, who put in an estimate of the cost of construction; Mr. G. W. Stevenson, Mr. Cleminshaw, Mr. Clift, Mr. Leather, engineer of the Burnley Corporation Gas-Works, and Mr. J. Taylor, manager of the Oldham Corporation Gas-Works. Mr. Stevenson submitted to the committee an estimate of the income and expenditure on a make of 1333 million feet of 19·45-candle gas and a sale of 1200 million feet of 18-candle gas, 10 per cent. being allowed for gas unaccounted for, and 1¾ candle for loss of illuminating power. According to this estimate, which assumed that the whole gas supply of the City would be in the hands of the Corporation, he made it appear that the total year's income, with a price of 3s. per 1000 feet, would be £234,658, and the total expenditure—including interest on capital at 6 per cent.—£229,793, leaving a balance of profit of £4865. Mr. Haywood and Mr. Stevenson both admitted that, if the Corporation got their Bill, the three companies who now supply the City would have to "shut up their works," which would be rendered nearly worthless, and might be then bought by the Corporation for little more than the value of old materials. The witnesses connected with Corporation gas-works in the provinces stated that the cost of manufacturing gas in their works would allow it to be sold with profit at the price named in the Bill, though the cost of the gas in Manchester and in Oldham was differently represented to be in the former 35·32d. per 1000 feet for 18-candle gas and in the latter town only 25·8d. for 17-candle gas. Among the witnesses called to support the Bill was the Hon. A. A. Cochrane, superintendent of the steam reserve at Chatham, for the purpose of informing the committee that there is a great pitch lake in the Island of Trinidad, from which many millions of tons might be obtained, and sold in the Thames at the rate of 32s. per ton, for the manufacture of gas of high illuminating power to supply the City of London.

The case of the promoters of the Bill was brought to a close rather unexpectedly early on the second day of the inquiry. Mr. Denison, who appeared on behalf the Chartered Company, then addressed the committee against the Bill, by which, he said, it was proposed to repeal the Metropolis Gas Act of 1860, and thus to do indirectly what the committee of last year said they would not do directly. He contended that that Act was in every respect a bargain between the companies and the public, and that, until it was clearly proved that the gas companies had violated that Act—which there had been no attempt to do—it was as gross a breach of faith on the part of the public of London as was ever denounced by a parliamentary committee, to seek to break that bargain. He protested strongly also against the proposed application of the corporate funds of the City to compete with commercial companies in the supply of gas, which was, he said, opposed to the principles of fair trading, and was intended to ruin the companies. On the third day, Mr. Hope Scott, who represented the other metropolitan gas companies, said it was their intention to confine their opposition entirely to the question of principle: whether it was just for Parliament to sanction competition with commercial companies, who were encumbered with many obligations, by a Corporation not so encumbered and supported by public funds; and, as that question had been already pressed on the consideration of the committee by Mr. Denison, he should not make any further observations. No witnesses were called by the gas companies against the Bill, and, after some evidence had been given on behalf of a petitioning landowner, the committee agreed unanimously to these resolutions:—

1. That this committee reaffirms the six resolutions adopted by the committee last year, on the 3rd day of July.

2. That the committee are willing to give the companies time to propose arrangements under the terms of these resolutions.

3. That, failing the proposal of such terms as can be accepted by the committee, the companies must be prepared to accept the passing of the preamble of the present Bill.

The six resolutions referred to, and which were made the foundation of the decisions of the committee during this inquiry, we now reproduce:—

1. That the supply of gas in London ought to be controlled in favour of the consumer, either by the means of an effective competition, or, if the system of an exclusive supply be maintained, by the means of effective regulation.

2. That neither of these conditions is adequately fulfilled by the system of exclusive supply now in operation under the arrangement sanctioned by the Act of 1860.

3. That no Bills for the establishment of a competing supply having been referred to the committee, the question of providing for the establishment of control by the means of competition does not immediately arise.

4. That the committee regard the establishment of a due control, by an amendment of the Act of 1860, upon the system of exclusive supply, as preferable to the future introduction of competing works, and are prepared to settle the present Bill accordingly, if that course be assented to by the parties.

5. That the extensive powers asked for by the Chartered Company and by the Imperial Company respectively, in the Bills now before the committee, are calculated to throw obstacles in the way of future competition, and that the committee are not prepared to entertain them until the general system of supply shall have been first placed upon a more satisfactory basis.

6. That the settlement must provide for the improved administration of the system by reduced expenditure, and the committee think that, by the amalgamation of some of the companies and improved arrangements of the districts, that object may be easily attained.

When the committee reassembled on the following day, the 5th inst., they were informed by Mr. Hope Scott that the ten companies whom he represented, including all but the Chartered, the Independent, and the South Metropolitan, were prepared to concur in any effective arrangements that could be required from them under the system of regulated monopoly, but that they were not prepared to go below their offer of last year as to price and illuminating power, nor to concede their arrears of dividends nor their reserve-fund. He added that they also considered it a permanent basis of the arrangement that there should be an annual revision of price and illuminating power. Mr. Beck, the governor of the Chartered Company, then submitted to the committee a resolution of his company, to the effect that they were prepared to assent to the principle of the six resolutions of the committee of last year, subject to the Bill of the Corporation being laid aside, and the company's Bill for power to construct new works at Barking being agreed to. The Independent and the South Metropolitan Companies, through their counsel, Mr. Davison, opposed any power being granted for compulsory amalgamation. The views of the parties on all sides having been stated, the committee deliberated for a considerable time, and unanimously agreed to the following important resolutions:—

1. That the committee agree with the committee of last year in the conclusion that they will not, without the consent of the companies, recommend the adoption of a Bill compelling the companies to supply the consumer on other terms than those on which they have been authorized by Parliament to raise, and have actually raised, the capital which they employ.

2. That in any Bill for the amendment of the Act of 1860 they will not be satisfied with terms less favourable to the consumer than those recommended by the committee of last year.

3. That, as between the companies generally and the Corporation, the committee are prepared to proceed with the Corporation Bill; but, before doing so, they will hear from the Chartered Company a statement of the terms on which, and the extent of district to which they are prepared to supply gas in the City.

By the first of the foregoing resolutions the committee bind themselves to the condition which they were last year compelled, somewhat reluctantly, to accept, in consequence of the agreement between the gas companies and the Board of Trade, and so far as the principle on which further legislation is to be based on the recommendation of the committee, the companies outside the boundaries of the City have obtained all that they could reasonably require. Whether that resolution be consistent with the two subsequent ones it remains for the committee and the promoters of the Corporation Bill to show.

On Thursday, when the committee again met, it was announced that the Chartered Company accepted the terms on which it was required by the Committee that they should supply the City with gas, it being understood that the general arrangements of the Bill of last year should be adhered to. It was further stated that the City Gas Company and the Great Central Company also accepted the same terms, with the modification that the price at the end of 1869 should be fixed by the revising commissioners, and that they should each have a reserve-fund of 5 per cent. On these propositions the committee deliberated, and agreed to the following resolution:—

That the committee will proceed to settle the Bills before them so as to secure to the consumers throughout the City terms of supply not less favourable than those recommended by the committee of last year.

The further proceedings were then adjourned to allow the three companies the opportunity to consider the terms to be proposed. On the next morning it was announced that the Great Central and the City Companies assented to the same terms as the Chartered Company, the claim for back dividends being abandoned. After some discussion as to the further mode of proceeding, the committee came to this resolution:—

The Corporation of the City, by coming before us with their Bill, have enabled us to give effect to our views with respect to the City. The Metropolitan Board of Works are not before us with any Bill of their own. The scope of the Metropolitan Gas Amendment Bill is now limited to the supply of the City, and we do not think it will be expedient to prejudice in any way the future proceedings of Parliament with respect to other Metropolitan districts.

An adjournment then took place to Monday, it being arranged that the Metropolis Gas Act Amendment Bill should be altered in the meantime so as to apply exclusively to the supply of gas to the City of London. Yesterday the committee were occupied with the discussion of those clauses of the Metropolis Gas Bill, limited in its operation to the City, on which the parties could not agree. The Corporation wanted to reduce the maximum price, after 1869, to 3s. 6d. per 1000 feet, and to make several alterations in the clauses relating to the revising commissioners; but those and other objections were decided in favour of the gas companies.

The result of the inquiry, which, compared with that of last session, has occupied a very short time, will in all probability be the rejection of the Corporation Bill, and the amendment of the Metropolis Gas Act, so far as relates to the City of London, in accordance with the provisions of the amended Bill of last year. The Imperial Company's Bill will be rejected, as that company refuses the conditions on which the committee insist; and the limitation of the amendment of the Act of 1860 to the City of course puts an end to the opposition of the Metropolitan Board. All the other metropolitan gas companies, with the exception of those which supply the City, will continue under the same regulations as at present. There can be no doubt that the gas consumers of the City will derive important advantages from the proposed new arrangements, but they are not sufficient to satisfy such a radical gas reformer as Mr. Dresser Rogers, a howl from whom is sounded in the *Standard* of Saturday last, with the intention of getting up a renewed agitation for gas at 3s. 4d. per 1000 feet.

After the recent advances in the price of materials for the manufacture of gas, we are glad to notice that there has been a fall of from 1s. to 1s. 6d. per ton from last year's prices of Newcastle gas coals, some large contracts having been made as low as 5s. 6d. per ton; and freights have at the same time been considerably lowered.

The number of those subscribers to the JOURNAL OF GAS LIGHTING who have expressed their desire to possess copies of a complete descriptive index of the work from its commencement in 1849, is yet far too small to justify the commencement of the undertaking. It is requested, therefore, that all who wish to subscribe for it will apply without delay to Mr. King, 11, Bolt Court, Fleet Street, E.C.

Communicated Article.

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EXPERIMENTS ON THE FLOW OF GAS IN LONG PIPES,

MADE IN THE WORKS OF THE PARIS GAS COMPANY

By M. ARSON, Engineer of the Company,

Assisted by

MM. MONARD and HONORÉ.

TRANSLATED EXPRESSLY FOR THIS JOURNAL

By Dr. POLE, F.R.S., Mem. Inst. C.E.

(*Continued from page* 300.)

REMARKS BY THE TRANSLATOR.

The experiments recorded in the foregoing paper seem very interesting and valuable, as being the most comprehensive and careful that have ever been made on a scale corresponding to the circumstances of ordinary practice. It will be well, therefore, to examine them by the light of our former knowledge, in order to ascertain, with a practical view, the nature of the addition they make to the information we possess on the subject.

In the JOURNAL OF GAS LIGHTING for June, 1852, was inserted an article, by the writer of the present remarks, "On the Motion of Fluids in Pipes." This treated the subject generally, deducing, by a combination of reasoning and experiment, formulæ for the flow of any fluids, and setting forth the mode in which these

formulæ were applicable in practice. Examples were given for the flow of water, atmospheric air, and illuminating gas, and I have reason to believe that the rules there given have been largely adopted and found to answer in practice as well as rules of general application could be expected to do.

In order to discuss the application of the additional data now placed at our disposal, it may be convenient to recapitulate, in an abbreviated form, the reasoning there given, so far as it applies to gaseous fluids.

Supposing the gas to move along a horizontal straight pipe with a uniform velocity, we have only here to consider what will be the force necessary to overcome the *friction* caused by the rubbing of the gas along the sides of the pipe.

The friction of fluids upon solids depends on laws altogether different from those which regulate the friction of solids upon each other. The former have not been so well investigated as the latter, but the following principles may be taken as applicable:—

1. The friction of a fluid upon a solid is independent of the hydrostatic pressure to which the fluid is subjected.

2. It is proportional to the area of the rubbing surface, so that if l = length of pipe and c its circumference, the friction will vary as $l\,c$.

3. It may also be assumed to be proportional to the specific gravity of the fluid, which call s.

4. It varies with the velocity, but in what exact ratio does not appear, as a general question, to be well determined. In the former paper it was assumed, as a simple rule near enough for ordinary practice, to vary nearly as the *square* of the velocity; but this is the point in which the new rule principally differs from the former one, as will be explained by-and-by.

5. In the paper of 1852 we adopted the usual hypothesis, that the friction was independent of the nature of the surface of the solid, provided only it was so smooth as not to offer material obstruction to the fluid passing along it. In the present paper the authors give reasons for believing that the nature of the interior surface of the pipe has a material influence on the friction, and they instance comparative experiments on pipes of cast iron and tin plate, similar in every respect except that of the material, and which show that the friction with the latter is only about two-thirds that with the former. The fact is, no doubt, very important, and highly deserving of attention in practice, but the knowledge we yet have in respect to it is so limited that we cannot introduce it into any theoretical investigation. We must, therefore, merely take the precaution of observing that rules obtained for one material will not be applicable, without modification, to another.

Combining the above principles, let f = force necessary to overcome the friction caused by the passage of a fluid whose density is s, with a mean velocity v, along a pipe, say, of ordinary cast iron, whose length is l and circumference c. Then if M be a coefficient to be determined by experiment—

$$f = \mathrm{M}\, lcs\, v^2.$$

But this force is obtained by putting a pressure on the fluid at one end greater than that at the other end. Let this pressure = p, and let A = area of the pipe—

$$p\,\mathrm{A} = f.$$

The effect of variation in the pressure along the pipe will be to alter the density and volume of the gas, and so to affect its velocity; but as this effect, in ordinary cases, is but trifling, and as its introduction would produce great complication, we may follow the same course as the authors of the paper, and by taking *mean* values of the density and the velocity, exclude the variation from consideration.

Taking, then, the case of a pipe of circular section, whose internal diameter = d, and representing the pressure p by the height of an equivalent column of water, which call h, we shall have—

$$h = \frac{\mathrm{N}\, lsv^2}{d}.$$

The mode of determining the constant is fully explained in the paper of 1852. It will suffice here to give the result.

If h = head of water in inches representing the loss of pressure,
l = length of pipe in feet,
d = diameter of pipe in inches,
s = specific gravity of the gas, that of atmospheric air being = 1,
then in round numbers,

$$h = \frac{ls}{14{,}100d}\,v^2,$$

which corresponds with the formulæ given in 1852, the shape only being somewhat altered to suit our present object.

Now, the difference between this rule and the one deduced from the new French experiments is, that in the latter the friction is made to vary not as v^2, but as

$$av + bv^2,$$

where a and b are both coefficients determined by experiment. They are said to be constant for the same diameter of pipe at all velocities, but to change for different diameters. I have thought it advisable, for the sake of comparison, to recalculate them for English measures, and to adapt them to the shape of the formula above given.

Adhering to the same notation, the French rule is,

$$h = \frac{ls}{14{,}100d}\,(av + bv^2).$$

the values of a and b being, for cast-iron pipes, approximately as follows:—

Diameter of Pipe.	Value of a.	Value of b.
2 inches	7·35	1·90
4 ,,	5·78	1·52
6 ,,	4·55	1·375
8 ,,	3·45	1·250
10 ,,	2·55	1·15
12 ,,	1·81	1·05
14 ,,	1·19	0·97
16 ,,	0·76	0·895
18 ,,	0·40	0·83
20 ,,	0·19	0·78
22 ,,	0·05	0·735
24 ,,	0·00	0·70
26 ,,	0·00	0·665
28 ,,	0·00	0·635

An examination of this table and formula will show that for the smaller sizes of cast-iron pipes the new rule gives a very much greater loss of pressure than the old one. For example, to drive atmospheric air along a 2-inch cast-iron pipe 1000 feet long, with a velocity of 5 feet per second, would require, according to the old rule, about 9-10ths of an inch pressure; but according to the French rule it would require about 3 inches, and this without any allowance for irregularities of any kind.

On the other hand, in the larger sizes of pipes, the French rule gives much less loss of pressure than the old one. For example, in a 26-inch pipe only two-thirds the pressure would be necessary to produce any given velocity.

These wide differences from rules which have been hitherto generally received and found to work satisfactorily appear somewhat startling, as does also the large effect said to be due to the material of which the pipe is constructed. I cannot withhold my testimony to the value of the experiments, and to the excellent practical way in which they appear to have been conducted, but I think it would be only prudent that, before the rules drawn from them are accepted as conclusive, they should be repeated and confirmed by other experimenters.

Correspondence.

ON THE ESTIMATION OF SULPHUR IN COAL GAS.

SIR,—Allow me to make some remarks, though rather tardily, on an article which appeared in your valuable JOURNAL on the 7th of January last, by Mr. Valentin, principal assistant in the Royal College of Chemistry. The question of the estimation of sulphur in purified coal gas, which has for many years occupied the attention of engineers and of the public in England, should be considered from two points of view altogether different, which I shall call the theoretical and the practical views of the question.

Looking at it theoretically, or from the scientific point of view, the object is to determine the mathematically exact quantity of sulphur in the gas. When viewing the question practically, it is necessary to ascertain the causes which obstruct the detection of that substance, and to determine the quantity which, during the combustion of the gas for domestic purposes, might produce an effect injurious to health or be destructive to furniture, books, &c. Does the process mentioned by Mr. Valentin accomplish either of those objects? I think not, and I will endeavour to show why.

His process, which consists in burning gas mixed with air when passing over spongy platinum, is not new, a similar arrangement having been used in 1854 by Dr. Letheby, in his experiments on the sulphide of carbon in gas. Even according to Mr. Valentin, that method does not determine the total quantity of sulphur in the gas, and I think that is less owing to the imperfect absorption of the sulphur products, or to the difficulty of extracting them from the platinum by washing, than to the imperfect combustion of the sulphur; and I have no doubt that, if Mr. Valentin were to substitute pure oxygen for atmospheric air in his experiments, he would obtain much more favourable results, and probably obtain the whole of the sulphur contained in the gas. But it appears to me that the process adopted in my experiments, afterwards repeated by Mr. Alfred Anderson and by Mr. Valentin, which consists in passing the gas over quick lime or soda lime, heated to redness in a drawn-iron tube, is more simple than that of Mr. Valentin, as it does not require the making of oxygen for special aspiration, and gives exact mathematical results of the quantity of sulphur in the gas. I cannot admit that the use of nitric acid or of hypochlorites can occasion the least difficulty to experimental chemists.

In reply to the doubt expressed by Mr. Valentin as to the correctness of the proportions I obtained by means of lime in 1864, I wish him to bear in mind that those experiments were made at the experimental works of the Paris Gas Company, expressly on gas obtained by varied distillations of coal of the most different kinds possible; which circumstance explains the great differences in the results obtained.

Let us look, however, to the practical part of the question, which, in point of fact, will constitute the only interesting part of the discussion that will probably take place this year, in considering any measure on the subject to be brought before Parliament. In the reports of Dr. Letheby to the Commissioners of Sewers of the City of London, on the sulphur compounds in gas, which must be first considered, he states that, during the combustion of gas, the sulphur it contains produces sulphurous and sulphuric acid, which injure furniture, and especially books in libraries. I will not again discuss what value is to be placed on that statement, for I have previously shown how many other causes contribute to the production of sulphuric acid in the atmosphere of large towns; but there can be no doubt that, if it be admitted that any damage is really done by the sulphur in gas, it can only be the portion of it which is converted by combustion into sulphurous or sulphuric acid that can really produce any injurious effect. The other portion of the sulphur, which is not consumed, and which consequently escapes into the atmosphere in the form of sulphide of carbon or vapours of sulphuretted organic products, cannot have any corrosive action. Why, therefore, should any trouble be taken to devise complicated apparatus to make it apparent? The practical problem then remains, to provide an apparatus by which all the sulphurous products during the combustion of gas, in the ordinary methods in use, can be completely ascertained; and I think that the apparatus contrived by Dr. Letheby, which is generally employed in England, fulfils all the conditions required for that kind of experiment.

In that apparatus the gas is consumed with a Leslie's burner, under the best practical conditions for a good oxidation of the sulphur contained in the gas. The consumption with that burner is so slow, that certainly during the ordinary burning of gas so perfect a combustion does not take place, and which may be made similar to the blue flame necessary in heating apparatus—a mode of consumption which should be taken into consideration in the use of gas for domestic purposes. The condensation of the sulphur products (sulphurous and sulphuric acids) in the glass cylinder is complete; experiments having proved that a sensibly greater amount of sulphur is not obtained by increasing the number of those vessels, nor by filling them with ammonia. The apparatus of Dr. Letheby has the additional advantage that the experiments may be made on the average quality of the gas manufactured during the day of twenty-four hours, and does not require the least superintendence. An interval of a few seconds is sufficient to empty the liquor collected in the cylinder, the quantity of which affords a valuable check on the correctness of the progress of the experiment, and a fresh experiment may be immediately commenced by merely opening the stop-cock for the gas.

In a practical point of view, Mr. Valentin's apparatus is far from offering the same advantages. In the first place, the gas is consumed or decomposed under conditions not in the least like the usual manner of burning gas in private houses, and though the apparatus does not estimate the whole of the sulphur in the gas, nevertheless in these experiments a part of it is taken cognizance of which practically is not of the least interest, as it generally escapes into the air in a form that is not injurious. Furthermore, the apparatus is complicated; it requires difficult manipulation, a complicated fitting up and taking down, a continued superintendence during the whole time of the experiment, in order to supply an adequate quantity of air to the tube; and, as the experiment lasts only a few hours, the average quality of the gas made during the day cannot be ascertained. In short, I believe that this very ingenious apparatus of Mr. Valentin's is adapted exclusively to the laboratory, as it can only be used by an experimental chemist, and that it does not possess that practical working character required in a testing apparatus that is to be used rather by intelligent workmen than by men specially devoted to scientific pursuits.

In conclusion, long consideration of the subject of the sulphur contained in purified gas has induced me to regard the simple apparatus of Dr. Letheby as the one which best fulfils the practical conditions of an instrument for testing the quantity of sulphur which, unfortunately, the progress of science has not yet succeeded in completely extracting during the manufacture of gas.

ALBERT ELLISSEN, Engineer,
Chief of the Experimental Works of the Paris Gas Company.

Paris, April 15, 1868.

[We are informed that Dr. Letheby made a large number of experiments, in 1854, with an arrangement on the same principle as Mr. Valentin's, the products of the burnt gas being passed with an excess of atmospheric air through a mass of very fine platinum wire, at a temperature a little below redness; and the results were so unsatisfactory that the process was abandoned. Dr. Letheby also endeavoured to estimate the sulphur by passing the gas through a glass tube filled with small pieces of caustic baryta (obtained from the nitrate by ignition), and kept at a red heat; but, as the process could not be continued for 24 hours—the time necessary for a fair analysis—this also was abandoned.—ED. J. G. L.]

Register of New Patents.

1834.—THOMAS RAFFERTY, of Manchester, in the co. of Lancaster, gas engineer, and JOHN HENRY STOREY, of the same place, brass-founder, for "*An improved apparatus to be employed in moving from place to place, laying down, and jointing metal pipes.*" Patent dated June 24, 1867.

This invention consists in the construction and employment of travellers of the form or forms, and for the purposes described, fitted with wheels, either with or without gearing for actuating the wheels, or any number thereof, the wheels being adapted to run upon rails laid upon each side of the trench in which the pipes are to be "laid," or being adapted to run upon a rail laid on one side of the trench, and upon a plank laid upon the other side of the trench, the traveller being fitted with the "tup," and for adjusting the height of the same; and, secondly, the general construction and arrangement of the apparatus, and of the lifting and other "tackle" attached thereto or connected therewith, as described.

1837.—ELLIOTT PERRY GLEASON, of the city and co. of New York, U.S.A., gentleman, for "*Improvements in cylindrical or Argand gas-burners.*" Patent dated June 24, 1867.

This invention consists in placing an adjustable deflecting point or surface immediately over or in front of the inlet aperture through which gas is supplied to the burner, and in duplicating its jet or flame openings.

1846.—THOMAS CROW, of West Ham, in the co. of Essex, tar distiller, for "*Improvements in the manufacture of illuminating gas from gas-tar oil or from gas tar.*" Patent dated June 25, 1867.

The oil or gas tar (commonly called creosote or dead oil) is extracted from the gas tar in the usual way, and, when obtained, is placed in a tank or reservoir situated at such a height as to produce the degree of pressure required. From this tank the oil flows down through a pipe into a heated vessel or vaporizer. A continuous stream of the oil is allowed to flow over the bottom of the vaporizer only just sufficient in quantity to wet it, and in so doing it is instantly converted into vapour. The vapour so formed passes into a superheater which is maintained at a bright red heat. The outlet of the superheater must be sufficiently small in proportion to the generating capacity of the vaporizer, so as to maintain a constant accumulation of vapour, and consequent high state of pressure in the superheater. The vapour thus exposed simultaneously to a great heat and a high pressure is converted into permanent gas of great illuminating power, which can be dealt with as ordinary coal gas.

1849.—ADAM AITCHISON, of 6, Park Terrace, Peckham, in the co. of Surrey, and THOMAS SOUTH, of Bridge Street, Southwark, in the said co., gas engineers, for "*Improvements in means or apparatus for the production of gas for illuminating and other uses from hydrocarbons, which apparatus is also adapted to be used for culinary and other heating purposes.*" Patent dated June 25, 1867.

The hydrocarbon is conducted by a pipe from a reservoir into a retort which has a lump or lumps of fire-clay adapted to receive sufficient heat to convert the hydrocarbon which is caused to fall thereon into gas. The vapour or gas thus generated, rising in the retort, passes through perforations in a surface of fire-clay, &c., applied so as to become highly heated, and form surfaces towards the upper part of the retort, by the heat thereof to further heat the vapour or gas obtained, and which thence passes into the upper part of the retort, and is conveyed away to a purifying and storing apparatus for use.

APPLICATIONS FOR LETTERS PATENT.

1361.—PETER SPENCE, of Newton Heath, Manchester, in the co. of Lancaster, manufacturing chemist, for "*Improvements applicable to the purification of gas used for illumination.*" April 25, 1868.

1369.—FRANK CLARKE HILLS, of the Chemical Works, Deptford, in the co. of Kent, manufacturing chemist, for "*Improvements in the manufacture of gas and in the purification of 'gas liquor,' and in utilizing gas tar and crude hydrocarbon oils, and in furnaces for effecting the combustion of the said gas tar or hydrocarbon oils.*" April 25, 1868.

1374.—VICTOR DELPERDANGE, of the city of Brussels, in the kingdom of Belgium, civil engineer, for "*Improvements in the construction and modes of connecting pipes or tubes of metal or other material.*" (Complete specification.) April 27, 1868.

1393.—GION BAPTISTE BABACCI, of Florence, in the kingdom of Italy, for "*Improvements in gas-engines.*" April 29, 1868.

1423.—JOSEPH LILLIE, of the city of Manchester, engineer, for "*Improvements in apparatus for regulating, measuring, and registering the flow of liquids.*" May 1, 1868.

1428.—JOHN WARNE, of the Blackfriars Road, in the co. of Surrey, pewterer and beer-engine manufacturer, for "*A new or improved union junction or fastening for pipes and tubes.*" May 1, 1868.

1429.—WILLIAM EDWARD EVERITT, of Birmingham, in the co. of Warwick, tube manufacturer, for "*Improvements in the manufacture of copper, brass, and metal tubes.*" May 1, 1868.

1430.—PAUL MARLIN and AUGUSTE TACK, of Brussels, in the kingdom of Belgium, civil engineers, for "*An improved method of and improvements in apparatus for producing gases from liquid hydrocarbons, and employing the same for illuminating and heating purposes.*" May 1, 1868.

1434.—HENRI ADRIEN BONNEVILLE, of 10, Sackville Street, Piccadilly, in the co. of Middlesex, patent agent, for "*Apparatus for measuring and registering the flow of liquids.*" A communication. (Complete specification.) May 2, 1868.

1444.—William Robert Lake, of 8, Southampton Buildings, Chancery Lane, in the co. of Middlesex, consulting engineer, for "*An improved mode of and apparatus for generating gas and mixing the same with atmospheric air for heating and illuminating purposes.*" A communication. May 2, 1868.

1458.—David Pitcairn Wright, of the firm of Wright and Butler, of Birmingham, in the co. of Warwick, lamp manufacturers, for "*Improvements in pouring or drawing off, measuring, and regulating the flow of liquids, applicable for stationary or portable uses.*" May 5, 1868.

1459.—David Pitcairn Wright, of the firm of Wright and Butler, of Birmingham, in the co. of Warwick, lamp manufacturers, for "*Improvements in the manufacture of certain descriptions of taps.*" May 5, 1868.

1467.—Joseph Hickmott, of Clapham, in the co. of Surrey, engineer, for "*Improvements in preserving metallic articles from oxidation and decay.*" May 5, 1868.

1468.—John Court, of Sheerness, in the co. of Kent, for "*Improvements in traps or apparatus for receiving sewage matters, and separating the solid from the liquid portion thereof.*" May 5, 1868.

1481.—John Young, of Aspull, in the co. of Lancaster, for "*Certain improvements in the construction of ovens to be employed in the manufacture of fuel termed 'coke,' oil, and gas.*" May 6, 1868.

1502.—Robert Harlow, of Heaton-Norris, in the co. of Lancaster, brassfounder, for "*Improvements in apparatus for supplying water to and withdrawing water from baths, wash-basins, and other receptacles.*" May 7, 1868.

GRANTS OF PROVISIONAL PROTECTION.

1090.—Miles Hawthornthwaite, of Lancaster, clerk, and Thomas Abbott, of Lancaster, plumber, both in the co. of Lancaster, for "*Improvements in taps, cocks, or valves, for water, gas, steam, or other liquids.*" March 31, 1868.

1152.—James Dunbar, of 49, Vicarage Road, Camberwell, S.E., engineer, and Richard Nicholson, of Dulwich, S.E., gentleman, both in the co. of Surrey, for "*Improvements in the construction and arrangement of machinery or apparatus for supplying coal, cannel, or other substances to retorts or ovens, and for withdrawing the same after distillation; also improvements in retorts, retort-chambers, mouthpieces, doors, covers, or lids.*" April 6, 1868.

1211.—Henri Adolphe Archereau, of 29, Boulevart St. Martin, Paris, France, chemist, for "*A new method of obtaining heat and light, and its various applications, and in apparatus connected therewith.*" April 11, 1868.

1237.—George Glover, of Ranelagh Road, Pimlico, in the co. of Middlesex, for "*Certain improvements in the arrangement and construction of submerged or subaqueous lamps, and in the fluid used in and adapted to such lamps.*" A communication. April 15, 1868.

1249.—Henry Sugden Evans, of the firm of Evans, Lescher, and Evans, of Bartholomew Close, in the City of London, for "*Improvements in taps, valves, or apparatus for measuring and registering the quantity of liquid passed therethrough.*" April 16, 1868.

1279.—John Cooke, of Darlington, in the co. of Durham, mining engineer, for "*Improvements in the construction of rotary engines and pumps.*" April 20, 1868.

1283.—William Malam, of Old Kent Road, in the co. of Surrey, gas engineer, for "*Improvements in the manufacture of gas and in apparatus employed in such manufacture, part of the invention being also applicable to the manufacture of retorts, retort-casings, crucibles, and melting-pots for various useful purposes.*" April 20, 1868.

1303.—John Johnson, of Levenshulme, near the city of Manchester, millwright and engineer, for "*Improvements in metallic packings for pistons, pump-buckets, and valves.*" April 22, 1868.

1317.—Henry Hill, of the town and co. of the town of Nottingham, brassfounder and general manufacturer, for "*Improvements in water-closets and in ball and other cocks, taps, and valves.*" April 22, 1868.

INVENTIONS PROTECTED FOR SIX MONTHS BY THE DEPOSIT OF A COMPLETE SPECIFICATION.

1374.—Victor Delperdange, of the city of Brussels, in the kingdom of Belgium, civil engineer, for "*Improvements in the construction and modes of connecting pipes or tubes of metal or other material.*" April 27, 1868.

1434.—Henri Adrien Bonneville, of 10, Sackville Street, Piccadilly, in the co. of Middlesex, patent agent, for "*Apparatus for measuring and registering the flow of liquids.*" A communication. May 2, 1868.

NOTICES TO PROCEED.

3706.—Marc Antoine François Mennons, of the firm of Mennons and Telescheff, of 8, Southampton Buildings, in the co. of Middlesex, patent agents, for "*Improvements in the mode of and apparatus for combining the vapours of liquid hydrocarbons with oxygen and hydrogen, and burning the mixture as fuel.*" A communication. Dec. 31, 1867.

557.—James Grafton Jones, of the Blaina Iron-Works, near Newport, in the co. of Monmouth, for "*Improvements in machinery for exhausting air, suitable to be used for ventilating mines, and for other similar purposes.*" Feb. 19, 1868.

634.—George Tomlinson Bousfield, of Loughbrough Park, Brixton, in the co. of Surrey, for "*Improvements in apparatus for raising and forcing water, and for feeding steam-boilers.*" A communication. Feb. 25, 1868.

676.—Richard Howard, of the town and co. of the town of Southampton, corn factor, for "*Improvements applicable to taps and cocks for various useful purposes.*" Feb. 28, 1868.

1172.—Charles William Siemens, of 3, Great George Street, Westminster, in the co. of Middlesex, for "*Improvements in the application of gas-furnaces to evaporating, smelting, puddling, and other manufacturing purposes.*" April 7, 1868.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1096.—Henry Kindon Taylor, "*Improvements in indicators and fastenings for water-closets and other purposes.*" April 20, 1865.

1099.—Meguerditch Houssepian, "*Certain improvements in pumps.*" April 20, 1865.

1109.—Francis Wise, "*Improvements in gas-regulators, and valves for the same.*" April 20, 1865.

1191.—Julian Bernard, "*Improvements in apparatus for raising water and other fluids, and in raising and lowering such apparatus.*" April 28, 1865.

1210.—Charles Edward Herpst, "*Certain improvements in pumps.*" May 1, 1865.

Miscellaneous News.

NEWCASTLE AND GATESHEAD GAS COMPANY.

An Extraordinary General Meeting of the Newcastle and Gateshead Gas Company was held at the Company's Offices, Neville Street, Newcastle, on Wednesday, the 22nd ult.—John Clayton, Esq., in the chair—to consider, and, if agreed upon, to authorize a subscription of such sum as might be determined on, not exceeding in the whole £5000, towards the undertaking known as the "Redheugh Bridge and Approaches."

The Secretary (Mr. Hardie) having read the notice calling the meeting,

The Chairman said that the powers which they were about to consider the exercise of were contained in the Redheugh Bridge Company's Act, 1866. Mr. Clayton then read the clauses referred to, giving the company power to subscribe £5000 to the bridge, and requiring that, for the privilege of laying and maintaining their pipes on the bridge, they should be content with 1 per cent. less dividend than the other shareholders of the bridge company. With regard to providing the £5000, the company had come to an agreement with the River Tyne Commissioners that £6000 should be paid to indemnify the company against the expense which would necessarily attend the removal of the pipes from the temporary bridge where they were at present laid, of which sum £5000 was to be invested in shares in the bridge company. Upon the subject of this agreement there had been a good deal of misunderstanding, and the company had been reflected on not very properly in consequence. It was said the company had attempted to avail themselves of their position to extract from the Tyne Commissioners an enormous sum. All that was done was to lay before the commissioners an account of the expense that would be incurred, if it became necessary in consequence of the bridge, to erect separate works in Gateshead. As time had passed on the difficulties which at first appeared so great had gradually disappeared. The company had also got powers for laying pipes across the High Level Bridge, without any stipulation or provision as to the payment to be made for the right of easement, which would have to be settled by reference, or by a jury. The erection of the Redheugh Bridge gave an additional facility, so that, even if not found necessary to erect works in Gateshead, the communications would, he trusted, be sufficiently maintained. He did not think the company would gain much by the arrangement with the Tyne Commissioners, but they would be fully indemnified for any cost they might incur. The chairman then submitted the following resolution:—"That the directors be, and they are hereby authorized to subscribe the sum of £5000 towards the undertaking of the Redheugh Bridge Company, and that the amount subscribed shall be met by an application to that extent of a pecuniary payment to be received from the Tyne Improvement Commissioners."

Mr. W. Douglas seconded the motion.

Mr. Nesbit said he had seen in the papers that an application had been made to the Tyne Commissioners to place more piers in the bridge than the company were authorized to have by their Act. Would that interfere with its construction?

The Chairman said that, after a consultation with their engineer, the Tyne Commissioners came to the resolution that, so far as they were concerned, there was no objection to the alteration.

Mr. Plummer said that, even with the addition, the arches of the Redheugh Bridge would remain wider than the High Level Bridge.

Mr. T. Burdon supposed that if they did not adopt this resolution, then there would be no alternative but to cross the High Level Bridge or erect works in Gateshead.

The Chairman said if the bridge was not erected, then the position of the company would be this: they had full powers over the High Level Bridge, depending only on what was to be paid to the North-Eastern Railway for the exercise of these powers, which he thought would not be anything unreasonable. The directors had also provided for the erection of separate works in Gateshead, which the increased range of the light they diffused might probably render necessary, but there was no immediate necessity for it. But for this contingency the directors had provided.

In reply to another question, the Chairman said if the Redheugh Bridge did not go on, then they got £6000 from the Tyne Commissioners, and took their chance of making their communication.

No other questions being asked, the Chairman put the resolution, and it was carried unanimously.

Mr. W. Brown, of Gateshead, moved a vote of thanks to the chairman for his conduct in the chair, which was seconded by Mr. Kimpster, and carried unanimously.

The meeting then terminated.

CONTINENTAL UNION GAS COMPANY, LIMITED.

An Extraordinary General Meeting of the Shareholders of this Company was held on Tuesday, April 28, at the City Terminus Hotel, Cannon Street—T. ALERS HANKEY, Esq., in the chair.

The SECRETARY (Mr. Fennessy) having read the advertisement convening the meeting, the following report was presented:—

Gentlemen,—Acting upon a wish expressed by some of the proprietors at the last ordinary general meeting, your directors have now called you together for the purpose of reporting to you, as far as lies in their power at this time of year, the progress made by the company since the 30th of June last. The accounts being only made up once a year, there are none at present to lay before you.

The board have the pleasure to announce that shortly after the last general meeting in the autumn, Mr. Thomas Alers Hankey and Mr. Maltman W. Shaw accepted an invitation to join the direction.

In their last report your directors mentioned the fact that during the months of July, August, and September, 1867, the profits from the working had considerably exceeded those of the corresponding period of 1866, and they have now much pleasure in stating that the subsequent accounts show continued and increasing improvement, and this notwithstanding the still existing depression of trade upon the Continent. This desirable result has been arrived at by assiduous attention to the reduction of current expenses, by the improved working consequent upon the large outlay made during the past few years, and by more favourable rates of freight; and would have been greater still but that during the summer months the cholera caused a total cessation of business at Messina, and great stagnation for some time afterwards. It is, however, satisfactory to be able to add that during the last six months an increase of 11 per cent. has taken place in the number of private lights at Messina. In other respects the working at nearly all the stations is daily improving, and the directors would have been able to increase the dividend but for the exchange on Italy, which will make a difference of upwards of 2 per cent. on the ordinary capital.

No new work of sufficient moment to merit your attention has been executed during the past season, and for the coming summer the outlay on capital account will be unimportant, and will be strictly confined to doing what is absolutely necessary to keep pace with the requirements of the stations, it may be summed up as follows, viz.:—

Nimes.—To telescope the two gasholders erected in 1864, and to make alterations and enlargements in the mains. The demand for gas in this town has grown far in excess of the means of manufacture and distribution, and there can be no doubt that the means now about to be adopted will not only ameliorate the working, but also tend to cause a large increase in the private consumption.

Strasburg.—To erect a duplicate engine for the exhausters.

Beaucaire.—To replace an old worn-out gasholder.

In conclusion, your directors, after careful consideration of the returns at present to hand, and acting upon the best estimate which they can now form, have resolved to declare an interim dividend on the ordinary shares of the company at the rate of 4 per cent. per annum, free of income-tax, which, together with the dividend of 7 per cent. on the preference shares for the same period, will be paid on the 1st day of May.

The CHAIRMAN: Gentlemen, I am sorry that Mr. Cubitt is so ill as to be unable to attend here to-day. I have been requested by my colleagues to take the chair, and in doing so I must throw myself upon your indulgence for any shortcomings which may arise out of this circumstance. The report just read, though short, has referred to the various points to which the board of directors have thought proper to advert. I am not aware that I can add anything to that report, but it appears to me that it may be desirable, and perhaps useful, that I should refer to two or three matters of considerable interest to us all as shareholders, arising out of the peculiar circumstances of the company at the present moment. One feature of an encouraging nature is that the income of the company is constantly increasing. In 1865 the gross revenue was £187,840, in 1866 it was £207,795, in 1867 it was £211,058, and in 1868 it will be £220,000; and it may be assumed that, unless special circumstances arise to prevent it, we may reckon upon a regular average annual increase of from 7 to 10 per cent. upon our gross income. Our present gross income, as I said, is about £220,000, and the annual increase of from 7 to 10 per cent. would be from £15,000 to £20,000 per annum, of which at least one-half may be considered profit. This profit is an increase of about 2 per cent. dividend upon the ordinary capital of the company. I am speaking now of the ordinary average increase of gas income, undiminished by any unusual and special circumstances, such as those which have occurred in the financial and commercial condition of Italy during the past and present years. You will observe that we to-day declare a dividend upon a larger amount of capital than existed before, as the ordinary capital has been paid up in full, but had it not been for the unlooked for and untoward state of Italian exchanges, costing more than £8000, the board would have been enabled to pay you 6 per cent. It was only last week I saw it stated in one of the daily papers that the Italian Government were very anxious to take measures to return to specie payment, which, if it had been done during the past half year, would have added 2 per cent. to the present dividend. Another feature in respect to all improvements at the stations, as affecting the shares of the company—and this is a point I think not duly appreciated—is that we are completing out of revenue, as time goes on, the purchase of a property of large reversionary value, besides the annual dividends you receive. It is calculated that the various stations constituting the property, which we are paying for out of income by annual payments, amount in value to £1,600,000 at the present moment. Of this property in the course of a few years this company will have acquired two thirds, and at that date the said property will not be worth less than £2,000,000 sterling. And as in the year 1883 the large annual payment now made, to the extent of £27,500, will have ceased altogether, the access to the income of the company, and consequently to the payment of dividends to the shareholders, must be large. Now, I venture to think that this fact also is not only unknown to the outside public, but is not thoroughly and duly appreciated by some of ourselves. Before closing these observations, I may say a few words about our shares and their position in the market. The heavy discount at which they stand, so far from being a fair criterion of their value, is the result of peculiar circumstances. Of course, the severe panic which has lasted so long has contributed to the depreciation of every description of share property, but the peculiar position of this company has caused an unnatural and almost an absurd depreciation in our shares, and I must add a depreciation totally unwarranted by the intrinsic state of the affairs of the company. You are doubtless aware that a very large sum had been borrowed from the Agra Bank, and when that bank became embarrassed and pressed the company for repayment, the board were obliged to call up the whole of the unpaid balance of the share capital at a time of considerable pressure in the money market. The consequence was that the shares of the company were pressed for sale when there were no buyers, and were thus forced down to a heavy discount, from which they have not yet recovered. But this state of things must soon cease. An investor buying shares at present prices, and receiving 3 or 4 per cent. to-day, will get 5 per cent. upon his capital. Should the dividends be increased, as ere long they will be, to 6 per cent., he will get 8 per cent.; and should we hereafter return to 8 per cent. dividend, the investor will get 10½ per cent. upon his capital invested at the present moment. Under these circumstances we may expect to find the shares of this company will not long remain at present prices, but will soon arrive at their proper value in the money market. I am not aware that there are any other points to which I need advert. I have made these few remarks feeling that they were interesting to us all. I do not wish to take a flattering view of our position; at the same time, I think we need not take a disparaging view of the position in which we stand, and which I conceive full of promise for the future. If there are any points upon which the shareholders desire information, I shall be most happy to furnish it, and will now conclude by moving that the report just read be received and adopted.

Mr. FAWCETT seconded the motion.

Mr. HARRIS asked what the directors had done to forward the suggestion thrown out at the last meeting, that the shares of the company should be made transferable to bearer, and which it was represented would make them more valuable for financial purposes.

The CHAIRMAN said nothing had as yet been done, but the subject had not been lost sight of; in fact, no step could be taken until the shares were paid up in full.

Mr. FAWCETT said it would be desirable to do it at the first opportunity, but it could be done at any time.

Mr. BEECH remarked that, in the present depressed state of the company's shares, he thought a reply to a question or two would be appropriate. The value of the shares depreciated at one time as much as 50 per cent., and they were even now at 25 per cent. discount. Under those circumstances it became extremely important to economize expenditure, and therefore he wished to know why nearly £5000 a year was expended in maintaining a London establishment, when, by the terms of the agreement with the *Union des Gaz*, they were compelled to spend £4000 a year for the same thing in Paris. There did not seem to him any commensurate advantage from the maintenance of duplicate establishments, more particularly as all the letters from the board and communications went direct to Paris, and the directors did not address any explanations to the managers except from there, according to the terms of the contract.

The CHAIRMAN said he believed the Paris expenditure was in strict conformity with the contract made with the *Union des Gaz*, and could not be reduced. He was not aware of any mode by which the London expenditure could be diminished. It was the desire of the board to conduct the affairs of the company with as much economy as possible, but there was a limit beyond which economy could not be practised. The expenses in London were about £4000 a year, which was not more than might naturally be expected in carrying on a concern like this.

Mr. FAWCETT said there was a certain amount of work to be done, and whether that was done in London or Paris seemed immaterial. A certain amount of force was required, and he doubted very much whether it would be practical to diminish the expenses, even if the London establishment were removed to Paris, or the Paris department of the business were conducted here. He would, therefore, suggest that it was not desirable to go into the matter at present, seeing that there was no practical question to be decided. The company were only just emerging from the difficulties they had been in for the last two or three years, and which were almost unexampled. The directors had given their best energies to bring about a result which he trusted was regarded by the shareholders as satisfactory, and they hoped soon to see the concern more developed, and that development manifested in the ability to increase the rate of dividend. There was a peculiarity in the position of the company, starting from the present point, with which he thought the shareholders should be made acquainted. They were, as the chairman had properly stated, working 15 or 16 very large concerns, involving an outlay of about £1,600,000; they had certain fixed charges to pay out of the profits of working every year—charges which were fixed whether they did well or ill—and the whole of the increase in the profits, after those fixed charges were paid, had to be divided over the small capital of £400,000. This was a point which he should wish the shareholders very much to keep in mind, because it was a very fortunate peculiarity appertaining to this company. As the chairman had already stated, the revenue at the present time was about £220,000 a year, and the average progress of increase in the rentals of gas companies was at the rate of from 7 to 10 per cent. per annum. Now, it was a perfect certainty that if this company could increase their rental at anything like that rate—if the state of Italy enabled them to progress in the ordinary way of gas companies—the dividends would not only be very large, but very large at a very early period, and for this reason: The natural increase of profits at these stations had already been explained, and if the company had to spread those profits over £1,600,000 of capital, the dividends would continue to be small; but, as those profits had only to be divided over a capital of £400,000, the rate would be very large. If a quarter per cent. increase was attained in the profits, it was 1 per cent. added to the dividends; if a half per cent. increase took place in the profits, it was 2 per cent. added to dividends. Therefore they must not be drawn off their guard by little drawbacks, and be induced to part with their property after having spent their money, as he hoped judiciously, and were about soon to reap the reward of all the trouble and anxiety they had had. And, talking of increase, he might, perhaps, be allowed just to refer to a case which he recently saw in the public papers, and which he was cognizant of irrespective of that. The gas company of Paris sent out in 1857 a quantity of gas for consumption equal to 56 million mètres. In 1867, after the lapse of ten years, the consumption had so increased that the quantity of gas sent out was equal to 136 million mètres—an increase of 143 per cent., or an average of 14 per cent. per annum. Now, it was a fact, from the peculiarity which he had endeavoured to explain to the meeting, that if the Continental Union Company were to increase their revenue at the rate of 6 per cent. per annum, in ten years from the present time they would be in a position to pay upwards of 25 per cent. dividends to their shareholders. This seemed a great deal to talk about; but, having got out of their difficulties, and being now in smooth water, the increase in the current year's revenue showed that their best anticipations were likely to be realized, and that the shareholders would very quickly be in possession of large and increasing dividends.

The motion was then put, and carried unanimously.

Mr. BEECH moved a vote of thanks to the chairman and directors, which was seconded by Mr. HARRIS, and cordially adopted.

The proceedings then terminated.

BAHIA GAS COMPANY, LIMITED.

The Ordinary Half-Yearly Meeting of this Company was held at the London Tavern, on Thursday, April 30—CORNELIUS NICHOLSON, Esq., in the chair.

The SECRETARY (Mr. A. Clarke) read the notice convening the meeting and the following report of the directors:—

The directors herewith place before the shareholders the usual statements of accounts for the half year ending Dec. 31, 1867.

The revenue account, including the former balance, shows a net profit of £3660 6s. 1d. after meeting the usual disbursements, and several items under the head of "Extra disbursements." These last-named items, excepting that which arises from the defalcation of a clerk, belong to former half years, and it is believed that all arrears of charges are now brought in. The available balance will allow dividends to be declared of 10 per cent. per annum on the preference, and 3 per cent. per annum on the ordinary shares (less income-tax), leaving £452 4s. to be carried to the credit of next half year's account.

The working expenses presented by this account contrast favourably with the accounts which have been for some time submitted to the shareholders; and further economy, in various ways, is now being effected by Mr. Green, the manager, which will be felt in the next balance-sheet.

The stock of fittings and stores stands, by necessity, as in the last published statement. A thorough revision of the stock is being made, by order of the board, which there was not time to complete for this occasion. Henceforth a new system of keeping this account will be in operation, in duplicate, one part being kept in London and the other in Bahia, which will have the advantage of affording a mutual check, and of enabling the directors to keep the exact state of the stock at all times in view.

Since the last general meeting of the company, Mr. F. Youle, a director, has, from motives of personal convenience, resigned his seat at the board. There is no necessity, and it is not therefore proposed to fill up the vacancy.

Dr. *Balance-Sheet, December 31, 1867.* *Cr*

To Capital paid up—					By Concession			£7,000 0 0
5000 ordinary shares	£100,000 0 0				Investment, to June 30	£85,172 11 8		
1000 10 per cent. preference ditto	20,000 0 0				Additional during the half year	305 3 10		
711 redeemable ditto	14,165 0 0					£85,477 15 6		
		£134,165 0 0			Freehold land	4,534 16 1		
Creditors—							90,012 11 7	
On open accounts	£2,840 10 5				Meters fixed		1,154 1 3	
On acceptances	3,366 8 8				Office furniture and fixtures		265 1 0	
		6,206 19 1			Preliminary expenses		16,914 17 3	
Dividends unpaid		1,146 11 3			Amounts due by sundry persons for fittings, gas and meter rental, residual products, &c.		7,706 9 10	
Revenue account—profit to June 30, 1867, as per last sheet	£636 2 9				Stock—			
Fitting account—one-sixth to be written off half yearly, as per resolution of general meeting, Oct. 29, 1867 £1,447 8 1					Coals	£11,100 18 11		
					Coke	181 16 0		
Less one-sixth for June half year	241 4 8				Fittings	4,765 17 10		
	1,206 3 5				Meters	281 18 8		
	£1,842 6 2				Main & service pipes, lamp-columns, and other materials	2,707 6 10		
Less dividend and income-tax declared	1,158 6 6						19,037 18 3	
					Bills receivable	£2,000 0 0		
Leaving unappropriated	£683 19 8				Ditto Mellor and Southall's dishonoured bill	250 0 0		
Half year's net profit, to Dec. 31	2,976 6 5						2,250 0 0	
		3,660 6 1			Cash at bankers—			
					General account	£830 5 1		
					Dividend ditto	7 12 2		
							837 17 3	
		£145,178 16 5					£145,178 16 5	

Dr. *Revenue Account, for the Six Months ending December 31, 1867.* *Cr.*

DISBURSEMENTS.					By Gas supplied—			
To Coals carbonized—1997-14/20ths tons	£4,507 12 0				To public lamps	£8,456 2 7		
Purifying materials	2 4 1				To private consumers and public establishments	3,029 0 0		
Carbonizing wages	744 7 9						£11,485 2 7	
Lamplighters ditto	827 6 6				Meter-rental		224 12 10	
Wages for labourers, loading coke, &c.	207 2 11				Coke		741 1 8	
Salaries	1,086 15 0				Tar		36 10 7	
Directors fees	—							
Auditors fees	10 10 0							
Rent and taxes	62 9 4							
Interest	28 4 9							
Stationery, printing, &c.	33 0 9							
Office expenses	47 8 8							
Medical attendance	33 15 0							
Keep of horses	27 0 1							
Trade charges	150 1 10							
Repairs and maintenance of public lamps	275 18 9							
Wear and tear	412 11 0							
Travelling expenses	46 5 9							
Law charges	24 6 7							
		£8,527 0 9						
EXTRA DISBURSEMENTS.								
Resetting boiler, removal to and fitting up of new offices, and removal of fittings, &c., at Bahia	£138 2 11							
Law charges, to June, 1867	12 14 6							
Engineering charges in 1866	17 0 0							
Mr. Blount, expenses to Bahia, balance thereof	50 0 0							
Steam Navigation Company's charges, 1863 to 1867	32 3 1							
Arrears of property-tax at Bahia, from 1862 to 1867	90 0 0							
Defalcation by Mr. Thorpe, a clerk at Bahia	402 15 4							
One-sixth difference in fittings, as per resolution, Oct. 29, 1867 (£1447 8s. 1d.)	241 4 8							
		984 0 6						
		£9,511 1 3						
Balance—net profit for the half year		2,976 6 5						
		£12,487 7 8					£12,487 7 8	

Dr. *Profit and Loss Account.* *Cr.*

To Proposed dividend of 10 per cent. on preference shares and 3 per cent. on ordinary shares		£3,208 2 1			By Balance from previous half year		£683 19 8	
Balance unappropriated, to be carried to credit of next account		452 4 0			Profit this half year		2,976 6 5	
		£3,660 6 1					£3,660 6 1	

The CHAIRMAN, in moving the adoption of the report, said he would offer two or three remarks in elucidation of the statements therein contained. Referring to the balance-sheet, it would be seen that during the past half year the only expenditure on capital account was £305 3s. 10d., which was the smallest sum added to capital in any half year since the establishment of the company. He need not detain the meeting by many remarks upon the revenue account, because it sufficiently explained itself. Comparing it with the corresponding period of last year, it would be seen that the income of the company was just £13 less—in other words, the earnings remained much as they were. The extra profit, therefore, which had been realized was the result of greater economy in working—*i. e.*, from a better system of management being in operation. Looking through the items of expenditure, it would be seen that there had been a saving in every one except that of wear and tear, and on this point he would remark that in a company which had no depreciation-fund, the directors could not be too careful about the proper charges being carried to the wear and tear account, and no shareholder who was acquainted with the working of a gas company would object to this item being larger than at the corresponding period of last year. The main feature of the account was this, that the increased profit of the half year was due to better carbonization of coal and a saving in the wages of the lamplighters. The improvement in the carbonizing department had produced a saving of £800 in the half year; and in the item of lamplighters' wages there had been a saving of £350. These sums, amounting together to £1150, were a very important matter, without reference to the other economies in the working charges. In reference to the better carbonization of coal, he might mention that whereas, in the corresponding half of 1866, Mr. Hunter Jones had used two-thirds of cannel and one-third Newcastle coal, Mr. Green, in obtaining his supply of gas in the past half year, used one-half cannel and one-half Newcastle coal. It would be recollected that at the last meeting Mr. Hunter Jones stated that it was not possible for him to furnish profits, because the cannel supplied to him was so wretchedly bad that he could not carbonize it. He (the chairman) made no remark at the time, although the subject had been gone into by the committee of investigation, thinking it would be better to leave the statement until the new manager had been able practically to test the accuracy of it. It was to Mr. Green's management the company were indebted for the saving effected in the last half year. Using identically the same cannel and Newcastle coal, he had got something like 1000 cubic feet of gas more per ton from those materials than Mr. Hunter Jones did, and also a correspondingly increased quantity of gas per mouthpiece. He (the chairman) regretted that Mr. Green had not been able to furnish the directors with a true statement of the stock of fittings, a sthis was a matter respecting which the directors and share-

holders were naturally very anxious. They felt, however, that it was of much more consequence to have the statement correct than to be furnished with an early statement which might admit of doubt, and they had instructed Mr. Green to be very careful and to go into the matter most minutely. He regretted the absence of Mr. Hunter Jones on this occasion, because in justice to the directors, he was bound to say that it was not possible for anything to be so grossly mismanaged as the matter of fittings had been. There was no longer any reason to doubt how it had occurred that there should have been mistakes from time to time. Not only had goods been ordered when there was a stock of those goods in hand, but chandeliers, brackets, and other articles had been allowed to be sent out to various parts of the town for temporary use, and no record whatever had been kept of these things, and no one knew how the stock stood. The company were very much indebted to Mr. Blount for the assistance he had rendered in ascertaining the exact state of things with regard to the fittings, and he (the chairman) hoped this would be the last time the directors would have to apologize for the mistakes into which the late management had allowed things to lapse. Mr. Green had also not had time to give the usual statement of the public and private lamps and meters fixed, but this would be supplied on future occasions. Amongst the "extra disbursements" in the revenue account there was an unfortunate item—a defalcation by a clerk at Bahia to the amount of £402 15s. 4d. This Mr. Thorpe was a person not sent out from England by the directors, but a clerk employed by Mr. Hunter Jones at weekly wages. Being engaged temporarily only, and it not being intended that money should pass through his hands, the usual precaution of requiring a guarantee of fidelity was not taken. Unfortunately, owing to a severe illness which laid Mr. Green aside for some weeks, Mr. Thorpe was entrusted with the charge of the moneys received by the collectors for rental, and he took advantage of his position to defraud the company. While regretting this circumstance, he thought the shareholders would concur with the directors in putting the £402 among the extra disbursements for the half year. It would be perceived that, for the first time, the directors had introduced a profit and loss statement into the accounts. That was not done so much with the view of showing a scheme for dividend at the present moment, but with an ulterior object. The company had had extra disbursements, and the shareholders would be glad to hear from him that for the future there might be extra receipts, for the directors could see their way to extra profits not hitherto obtained by the company. Of late there had been a great depreciation in the local currency of the Brazils, and a lower rate of exchange on England had ruled there than, perhaps, had ever before occurred. This depreciation might operate prejudicially to the company in their remittances, and the directors had instructed Mr. Green not to make remittances on London while the rate of exchange was low, and by this means they hoped to save some hundreds of pounds. The profit and loss account had been commenced with this in view, and as the company had no depreciation-fund and no capital to fall back upon to meet contingencies, the directors proposed to appropriate the money saved in this way to the formation of a reserve-fund. They also proposed, in conjunction with this, to be their own insurers for the coals sent out. It had cost the company for marine insurance, during the last six years, nearly £1100, and they had had one casualty only during that period for which they received £230, so that the difference between these two sums was in one sense lost. Of course, without a reserve-fund it would not be prudent for the company to become their own insurers, but if from the source he had indicated they could have a fund to fall back upon in case of accident, they might adopt that course with advantage, especially as the risks were not large as they never had a value, including freight, of more than £400. Another matter to which he must also allude was this—there were still 39 preference redeemable shares in the hands of the company, representing a sum of £780. The directors had come to the conclusion that the capital of the company should be completed, and it was intended that these shares should be placed in the hands of any who desired to have them. The directors would take them themselves at once, but they thought it better to give the shareholders the opportunity of taking them if they desired it, and the shares would be allotted to the highest bidders above par (ex dividend) whose applications were sent in on or before the 15th of May. If they were not taken by that time the directors would be ready to take them at that rate. On the last occasion of meeting a subject was brought before the shareholders in which they all felt a great interest—the leasing of the works to a contractor. A resolution was passed affirming the principle that it was desirable to lease them, and remitting the subject to the consideration of the directors. The board had most anxiously considered the question, and it was thought well to take the opinion of the solicitor as to the compatibility of thus working the concern with the Articles of Association and the Concession. Considerable difficulties presented themselves to the minds of the solicitor, and the opinion of counsel as to the legality of a leasing arrangement was taken. That opinion was to the effect that it was not in the power of the company to lease the works without the authority of the municipal or imperial Government. Such an authorization being out of the question, the matter was dropped by the board, and he was sure it would be by the shareholders. They might, he thought, cherish the hope that under the new manager the works would be brought into a thoroughly improved condition, and that the development of the business would enable them to realize more solid advantages than they had looked forward to through a contractor.

Mr. CROLL seconded the motion.

Mr. F. WILSON expressed his satisfaction at seeing Mr. Nicholson presiding, and the confidence he cherished that the energy and practical knowledge of the chairman would lead to a very much better state of things than the company had yet realized. The accounts of the last half year showed a decided improvement, and it was to be hoped that under the new management such items as arrears of property-tax from 1862 to 1868, and arrears of navigation charges, indicating as they did a laxity of attention, would altogether disappear in future. He wished to have some explanation of the reason for having so large a stock of coals on hand as £11,100 worth, which was more than a year's consumption; also why the item of "Directors fees" was left blank. The propriety of the company becoming their own insurers he thought required grave consideration.

Mr. BLAKE also called attention to the large stock of coals, and expressed doubts as to the policy of locking up so much capital in that item. He noticed that the average price of coal during the half year was 45s. per ton, a higher rate than they had ever paid before. He asked for an explanation of the disappearance of the item "Profit on fittings" from the balance-sheet, and congratulated the directors on the saving effected in lamplighters wages —a subject to which he had referred as demanding attention at former meetings. The defalcation of the collector he regarded as an indication of great mismanagement in the past. He questioned the policy of the issue of the remaining redeemable shares, and thought it was hardly fair to the ordinary shareholders to increase the preference interest against them. He hoped that, with their new chairman and new manager, the affairs of the company would be placed on a more satisfactory basis, and the recurrence of such a misfortune would be prevented.

Mr. MAUDE thought that, as the supply to private consumers was paid for in a depreciated currency, the price of gas ought to be raised. He regretted that it was found impracticable to effect a leasing arrangement, and suggested that it might not be unadvisable to ask the concurrence of the Brazilian authorities to such a project.

Mr. BLUNDELL said he had hoped to hear from the chairman some statement as to the future prospects of the company with reference to private lighting, and hoped that some opinion would be given on the subject.

The CHAIRMAN gave some further explanations respecting the circumstances which had enabled Mr. Thorpe to defraud the company. With reference to the stock of coals, he had no apology to offer—in fact, he rejoiced that it existed, knowing the company had a full equivalent for the money invested. In December, 1866, the stock of coals and other things amounted to £15,447, whilst the cash assets of the company, including the bills then floating, were £1541. In December, 1867, the stock amounted to £19,037, being a difference of £3590 in favour of the company; and the cash assets were £3087, being an increase of £1546; and these two items together made a difference of £5136 in favour of the company as compared with the previous year. The stock of coal was not liable to depreciation as some people supposed. The average cost of coal was, as stated, 45s. per ton, which was caused by the agitation in the metropolis running up the price of Boghead cannel last year from 42s. to 49s. per ton. The company were obliged at the time to send out 1300 or 1400 tons of Boghead at 49s., which made the average cost of the whole stock 45s. He was glad to say the directors had made a preliminary contract for Boghead this year, though not to the same extent, at 42s., and for Newcastle coal at 9d. per ton less than before; and this, with the lower rate of freight, would effect a saving to the company of about £1000. The improvement in the carbonization was producing a saving of £2300 or £2400 per annum. He was not able to make any statement as to the private lighting. It had certainly disappointed the directors, but he could give no explanation as to how it had occurred. It might be the effect of that economy which people naturally practised in time of war, when every article of consumption was dearer, and it became necessary with many to look carefully into every item of expenditure, and so much gas was not burned as at other times. It might, again, arise from defects in the meters. He could only say that the directors were watching the subject most narrowly, and he hoped an improved state of things would soon be realized. With reference to the item of directors fees being left blank, the explanation was that the board felt that as for two half years the ordinary shareholders had received no dividend, and the profits now only allowed of the payment of 3 per cent., they were not justified in charging the usual sum under this head. In reply to Mr. Blake, he could only state that he had no belief whatever in the truth or correctness of the "profits on fittings" which appeared in previous accounts—it was more than questionable. While thanking the proprietors who had spoken for the confidence they expressed in himself personally, he could not allow them to fall into the error that the improved state of the affairs of the company was due to him. The credit belonged exclusively to the new manager, and he had a very strong conviction, from the experience of Mr. Green's past conduct, that he would prove in reality "the right man in the right place." Mr. Blake was wrong in supposing that the issue of the remaining preference shares would have the effect of diluting the dividend to the ordinary shareholders. It would make no difference whatever, inasmuch as the amount would go to pay off the money which the directors had been obliged to borrow from their bankers. Mr. Maude also was mistaken in supposing that because the private consumers paid in a depreciated currency the company were losers by that circumstance. The proportion of receipts from private consumers was about one-third of the whole rental, and so long as those receipts fell short of the sum disbursed in wages and for materials in Bahia there could be no loss, and that state of things must last until the private consumption greatly increased. With regard to the future prospects, he must be excused from pledging himself to anything. All he could say was that he was a very large shareholder in the company, that he had lately increased his investment, and that was, he thought, the best proof he could give of confidence in future prosperity.

Mr. BROTHERS congratulated the directors on the improved state of affairs, which was certainly better than he had anticipated in so short a time. It struck him that the stock of coal was rather large, and if it had been all Newcastle coal, he should have considered it bad policy to have such a stock; but it must be remembered that cannel did not depreciate to anything like the same extent. He agreed with the chairman that the item of "Profit on fittings" was a delusive one, and he was not sorry to see it disappear from the accounts.

The CHAIRMAN reminded the meeting that the stock of coals was taken in December, and that all the coals sent from this country must necessarily be forwarded so as to arrive in the month of November. All the common coal would be used before a further supply could reach Bahia.

The motion was then put, and carried unanimously.

The CHAIRMAN moved—"That a dividend at the rate of 10 per cent. per annum for the half year on the preference capital, and at the rate of 3 per cent. per annum, free of income-tax, on the ordinary capital, be and the same is hereby declared." With respect to the time of paying the dividends, it would depend upon the receipt of remittances, which were expected on the following Saturday, in which case they would be payable in a week or ten days; in any case they would be paid before the end of May.

Mr. CROLL seconded the motion, which was carried unanimously.

On the motion of Mr. BROTHERS, seconded by Mr. MAUDE, a cordial vote of thanks was given to the directors, and the CHAIRMAN having acknowledged the same, the proceedings terminated.

SINGAPORE GAS COMPANY.

The Annual Meeting of the Shareholders of this Company was held at the London Tavern on the 28th ult.—HENRY PALFREY STEPHENSON, Esq., in the chair.

The SECRETARY (Mr. Robert King) read the minutes of the last meeting, and the following reports and statement of accounts, which had been circulated amongst the proprietors, were taken as read:—

The directors have the satisfaction of reporting continued progress in the lighting of Singapore, for particulars of which they refer to the report annexed from their engineer and manager, Mr. E. J. Wells, dated Feb. 18, 1868.

The directors going out of office by rotation are Messrs. Henry Palfrey Stephenson, Frederick Alexander Malcolm Nicol, and William Henry Le Feuvre, and these gentlemen being eligible for re-election, offer themselves for the support of the shareholders.

The present auditors, Messrs. William Thomas Morrison and Alfred Williams, retire from office according to the articles, and, being eligible for re-election, offer themselves to the shareholders for that purpose.

The balance-sheet to December 31, 1867, and appended to this report, shows the financial position of the company. The profits for the half year are £1106 14s. 8d.,

which, together with £3 14s. 2d., the unappropriated profit of the preceding half year, makes the available balance £1110 8s. 10d. Out of this sum the directors recommend the declaration of a dividend at the rate of 7½ per cent. per annum, less income-tax, on the preference capital, and a dividend at the rate of 4 per cent. per annum on the amounts paid up on the original capital, free from income-tax; the balance of £45 16s. 4d. to be carried forward to the profit of the succeeding half year.

The report of Mr. Wells, the engineer and manager, was as follows:—

Gas-Works, Singapore, Feb. 18, 1868.

Gentlemen,—I have again the honour to lay before you my report for the half year's working of the company. Although not so favourable as I could have wished it to have been, it is a statement of facts.

We have had to suffer with others, in consequence of the depression and dulness of trade in the East. The consumers curtail their gas as much as possible, when there is but little business doing, and the native population in Singapore fully understand the principles of the gas-meters.

There is the dark side; at the same time you will perceive by the accounts there is a bright side, and I trust that when you come to analyze them, you will be placed in a position to lay before the shareholders, at the next meeting, a more favourable report than you did on the last occasion.

It is satisfactory to know that we have not been retrograding during the past half year, but have still progressed, as you will perceive by the rental account; the increase has been 443.26 dols., and this has been effected with a decrease in the cost of the coal account. I do not think it necessary for me to take up your time by going further into figures, as the half-yearly returns have been carefully prepared, and will furnish you with all the details.

I have endeavoured, as much as possible, to carry out the promise I made in my last report, that was, to curtail the expenditure as much as possible; and I trust that by strict economy and an increased rental to make it a profitable investment for the shareholders.

At the close of the half year the coal question was causing me great anxiety; the high rates of freight in the East, and the scarcity of tonnage at Australia, rendered it impossible for coals to be sent on my limit. Two ships were despatched from Newcastle, N.S.W., on the 28th of September last, and did not arrive in Singapore until the 29th of January, thus making four months; one of them, the *Far Away*, I purchased to arrive, and the *Bessie*, after she arrived.

Both of them are very fine cargoes, and in good condition. The quantity of gas produced per ton ranges from 9000 to 10,000 cubic feet, of an illuminating power of 13½ to 14 candles, thus enabling me to dispense with the use of cannel coal. The prices were higher than I wished to give, but under existing circumstances I had no other alternative, as I am fully convinced that Australian is the best and cheapest coal for this climate.

The latest advices are that freights remain the same, and the demand for Australian coals far exceeds the number of ships at that port.

It affords me great pleasure to inform you that the works, apparatus, mains, &c., are all in good condition, and the buildings in thorough repair. For the general appearance of the works, I would refer you to the photographs sent last mail.

The demand for coke, tar, breeze, and ashes is quite equal to what can be supplied from the works. The accounts and returns as forwarded will show you what has been done in the general fitting department, and the profits made. The fitters are all fully employed, and every prospect of being so.

Upon the soundness of the mains and services I need only refer you to the engineer's half-yearly report. The working in the carbonizing department is quite satisfactory; one bench of brick retorts will be let down in a few days, to have the fireplace renewed. This bench has been at work twelve months.

The engine is working satisfactorily, and in the purifying department the oxide and ammoniacal liquor process is all that is needed, the gas being free from sulphur.

The collection in the rental upon the whole has been satisfactory. The arrears on the 1st of January were in excess of the previous half year; but you will note by the 1st of February balance-sheet they have brought to about the regular standard.

Bad debts and allowances are slightly in excess of the previous half year.

I regret the exchange has been so low, thus causing a considerable loss on remittances.

Upon the increase in the lighting department (this will not appear in the returns so much as in previous half years) the accumulation of unoccupied houses and removals rendered it necessary to strike them out to show a correct return. I have also discontinued to supply several small consumers who were in arrears of rental. You will note by my returns I have taken the whole of them off, only showing the actual number of houses, and lights burning to the 1st of January, which was:—Houses, 602; lights, 5295; 25 stoves; 33 private lamps and 353 public lamps. For the half year 73 houses and public buildings, with 490 lights; additional lights, 144; total 634; 3 boiling-stoves and 2 public lamps.

I have to apologize for my lengthened report, and, in conclusion, it affords me very great pleasure to be able to state that the demand for gas nightly is considerably on the increase.

Balance-Sheet, December 31, 1867.

Dr.				*Cr.*		
To Capital—				By Cash at bankers	£793 13 7	
£5 paid on 2000 preference shares	£10,000 0 0			Ditto in hands of secretary	8 16 8	
£5 „ 6979 ordinary ditto	34,895 0 0			Bills receivable	900 0 0	
£1 „ 55 „ „	55 0 0					£1,702 10 3
		£44,950 0 0		Office furniture		202 12 1
9034 shares.				Works and apparatus	£25,163 0 9	
				Meter account	1,511 12 2	
				Freight, insurance, and charges	4,109 5 3	
						30,783 18 2
Debenture bonds		4,700 0 0		Purchase of land		1,066 7 8
Sundry creditors		2,243 17 5		Retort account		464 19 2
Profit and loss		1,110 8 10		Meter renewal account		148 5 11
				Stock on hand		4,938 19 4
				Salaries, passage-money of engineer and workmen to Singapore, travelling expenses and wages in England		5,239 1 6
				Preliminary expenses and law charges		828 12 8
				Advertising and broker's commission		263 3 0
				Rent of offices, land, stationery, general charges; auditors, directors, and local committee fees; rates and taxes		1,480 9 5
				Loss on exchange		961 5 2
				Interest on capital and loans		2,067 14 2
				Gas-meter rental, fittings, and sundries under collection		2,755 9 10
				Sundry debtors		100 17 11
		£53,004 6 3				£53,004 6 3

Profit and Loss Account, from July 1 *to December* 31, 1867.

Dr.		*Cr.*		
To Coal carbonized	£1,542 9 11	By Balance at profit and loss, June 30, 1867	£898 3 7	
Lime and oxide	5 12 6	Less amount declared as dividend	894 9 5	
Trade and general charges	298 8 5			3 14 2
Rent, rates, and taxes	86 13 2	Gas and meter rent		3,843 1 6
Directors and auditors fees	205 5 0	Products, profit on fittings, and sundries		678 13 2
Salaries and collectors commission	421 10 2			
Wages	542 8 6			
Interest on loans and debentures	197 11 5			
Loss on exchange	79 2 7			
Bad debts and allowances	24 13 4			
Retort account	11 5 0			
Balance—profit for appropriation	1,110 8 10			
	£4,525 8 10			£4,525 8 10

The Chairman: Gentlemen, I have now to move that the report and the balance-sheet attached thereto be received, adopted, and entered on the minutes. I have very few observations to add to what is contained in Mr. Wells's report, which you have in a printed form. As regards our balance-sheet, you will see that our financial position remains very much the same as it was at the last meeting. We have called up the small sum of £100 more on our shares, and our creditors are about £600 more than they were on that occasion; but, on the other hand, you have something like £400 more assets, and the works are slightly increased. The cost of works and apparatus has been increased to the extent of £180, which arises from £100 which was given to Mr. Wells, and previously charged to capital account, as a bonus for the satisfactory completion of the works, and it was originally arranged with him that he should receive the £80 besides. There is a slight increase in the meter and service account. As regards our profit and loss account, we have this satisfactory feature, that with £96 less coal we have received £104 more gas-rental. This arises from having purchased some Australian coal at a lower price on the field than we shall be able probably to obtain it at again, unless freights rule lower than they have lately. Freights have ruled very high from Australia, owing to the scarcity of ships, which have been used for the Abyssinian war. However, that is now at an end, and we hope—indeed, the probability is, that we shall very soon get the benefit of reduced freights in the carriage of coal from Australia to Singapore. The other items in the profit and loss account are very small. We still have a loss of £80 on the exchange, which it is hoped will improve, and leave us better in that respect. The total result of our profit and loss account is, a profit of £1110 upon the half-year ending December last, against £850 upon the half year ending June 30; so that we have an improvement of profit in the half year which enables us to recommend you to declare a dividend on the ordinary share capital of 4 per cent., instead of a dividend of 3 per cent. as on the last occasion. The only item that at all calls for remark, or rather that I should like to explain to you, is an item in the profit and loss account, under the head "Products, profit on fittings, and sundries, £678." This is £17 less than it was last half year. On comparing the various items we have this result: We have realized £50 from sundries in lieu of £91; we have realized more for our coke, being £193 as against £147; we have received £136 for tar instead of £125, but we have lost on our fittings, having realized only £297 profit instead of £330; the total on all these items being that we are £17 worse than we were before. Mr. Wells has had his serious attention called by the directors to another matter. It will be in the memory of some of the shareholders present, that some time ago observations were made as to the expenses of management. Those observations were not lost sight of by the directors, and the matter has been prominently put before Mr. Wells, and I must congratulate the shareholders and the directors generally upon the ready manner in which he has endeavoured to conform to the suggestions that were, in consequence, made to him as to reducing the expenses of management at Singapore. Mr. Wells has endeavoured to meet our suggestions in every way that he could. I believe our instructions were that he should do it as far as he possibly could, without at all impairing the efficiency of the concern, and he has complied to this extent, that we have decided upon giving up the annual payment to the lawyer which we had there; we have been able to dispense with the office and the persons who attended it in the town of Singapore, and have removed all our operations to the works of the chairman of the local committee, who has kindly allowed us to have the use of a box and desk at his house, so that any letters can be sent or complaints made there. Mr. Wells has also been able to dispense with one of our out-door foremen—a European—and also with a repairer, and these economies will, we hope, assist our profit and loss account in the half year.

A Shareholder: Does Mr. Wells state what the saving will be?

The Chairman: About £300 per annum, or 140 dollars per month. One unsatisfactory feature in our operations at Singapore has been that the town is still suffering from the commercial crisis, and will perhaps suffer to a certain extent more than it hitherto has done. The effect of this is telling upon us in this way, that during the last half year houses have been closed representing 284 lights, and others temporarily closed representing 225 lights; so that whilst we have laid on 653 new lights in the half year, we have had to dispense with nearly 500 that have been discontinued, the result of the half year being, as I have told you, that our rental has increased only about £1000. Of course it would have increased considerably more if we could have retained our custom. I am afraid we shall have to look upon this state of things for some little time to come, as we in England are only just beginning to recover from the crisis which has afflicted us, and of course some time will be occupied before the reaction takes place abroad. With these observations I have to move that the report and balance-sheet be received, adopted, and entered on the minutes.

Mr. Benjamin Cooke, the deputy-chairman, seconded the motion, which was put and carried unanimously.

Mr. GARRAWAY: You have told us that you have considerably reduced the price of coal; can you tell us what it cost?

The CHAIRMAN: When I say that we have reduced the price of coal, I mean that we have reduced it during the half year now before the meeting. Some of our coal during that time has cost us 32s. or 33s. per ton. From that coal we have produced from 9000 to 9200 feet of 14-candle gas, with from 36 to 38 bushels of coke. Since then we have paid as much as 9¾ dollars, or an equivelent to 42s., for our coal.

The Hon. F. C. DRUMMOND: Have you made arrangements for a regular supply?

The CHAIRMAN: We have not done so as yet, but we have the matter under our consideration. We had hoped that we should have been able to be regularly supplied from the Waratagh coal-field. Our arrangements are now made with the Sydney coal market. We have had two cargoes, one by the *Far Away* and the other by the *Bessie*. The one produced 9000 feet of 14-candle gas, with 38 bushels of coke; and the other, 10,000 feet of gas of equal illuminating power, and about the same quantity of coke. I think we shall be able to ensure a regular supply of such coal at a moderate price, say from 34s. to 36s. per ton.

Mr. RICE: If you could ensure a supply of coal at 34s. we might look to something very bright in our concern, especially when you have been able to increase the profits at a time when you have been paying 45s. per ton.

A SHAREHOLDER: What is the price charged for gas.

The CHAIRMAN: Three dollars is our price for the private consumers, and about six guineas per annum for the public lights. I now beg to move—"That a dividend be declared to the preference shareholders at the rate of 7½ per cent. per annum, and to the ordinary shareholders at the rate of 4 per cent. per annum, free from income-tax, on amounts paid up on their shares from the respective days of payment to December 31, 1867, such dividends to be payable on May 30 next ensuing."

Mr. COOKE seconded the motion, which was adopted unanimously.

Mr. GARRAWAY said that, according to the Articles of Association, three of the directors retired from office by rotation—namely, Mr. H. P. Stephenson (the chairman), Mr. F. A. M. Nicol, and Mr. W. H. Le Feuvre—and those gentlemen having been tried and found to perform their duties very satisfactorily to the shareholders, he begged to move their re-election.

Mr. RICE seconded the motion, which was carried unanimously.

The CHAIRMAN then moved the reappointment of the auditors, Messrs. W. T. Morrison and Alfred Williams, who retired by the rotation. It was impossible, he said, for any company to have better auditors, and therefore he had great pleasure in proposing that they be re-elected to the office.

Mr. COOKE seconded the motion, which was carried *nem. con.*

The CHAIRMAN said he had then to move that the thanks of the meeting be given to the local directors and committee at Singapore, for the very satisfactory manner in which they performed the business there.

Mr. COOKE said that, knowing something of the working of the company out there, in addition to what appeared in the reports, he had every reason to be satisfied with the manner in which those gentlemen performed their duties, and therefore he had great pleasure in seconding the motion.

The resolution was carried unanimously.

A SHAREHOLDER: How many directors are there at Singapore.

The CHAIRMAN said there were four, but the number was uncertain, as changes at times took place. There were three or four gentlemen at home at the present time, and he and his colleagues had the advantage of conferring with them on matters appertaining to the works at Singapore. When any point arose they were ready to give every information. Mr. Simmons or Mr. Pattison might go out again in two or three months, and two or three of those at Singapore would return, so that changes were always taking place. He was sure that all present would second him when he proposed a vote of thanks to Mr. Wells, for the efficient manner in which he conducted the management of the works. Although he dared to say they bothered him with suggestions of one kind or the other, yet he (the chairman) was sure that Mr. Wells endeavoured to do all that he could to benefit the company, and always met the suggestions of the directors in a proper and becoming spirit. They were greatly indebted to him for the manner in which he conducted their business at Singapore.

Mr. GRAHAM asked if Mr. Wells was engaged for any length ef time.

The CHAIRMAN said that the present engagement was for three years—that is, that it was for two years next August. On this new arrangement they had given him an increase of salary.

Mr. GRAHAM: To what amount?

The CHAIRMAN: To the extent of £50 per annum. We always intimated to him that his salary would be increased if the company realized 6 per cent. per annum, so that our interest would at the same time be his.

Mr. GRAHAM then proposed a vote of thanks to the directors, and spoke of the readiness with which they and the chairman gave every information in respect to the position and management of the company.

Mr. HUNTER seconded the motion, observing that everything connected with the company appeared to be very satisfactory.

The resolution having been unanimously passed,

The CHAIRMAN returned thanks on behalf of himself and colleagues. He felt there was not that brilliant success that they hoped some day would be; but whether it were so or not, he would promise the shareholders that they should know at all times exactly what the position of their affairs was.

Mr. MORRISON said that he had much pleasure in proposing a vote of thanks to their excellent secretary, Mr. King. They always found him most courteous and ready to give every information with regard to the company, and in every respect he was deserving of the best thanks they could give him.

Mr. RICE seconded the motion, and also bore testimony to the uniform courtesy of Mr. King.

The motion was carried unanimously.

Mr. KING briefly and appropriately replied.

The CHAIRMAN said that the thanks of the meeting were also certainly due to their auditors, for the able manner in which they performed their duties. Two sets of books were kept, one in English money and one in dollars, and their work in consequence was doubly heightened.

Mr. RICE seconded the motion, which was carried.

Mr. MORRISON was much obliged for the kind compliment that had been paid to him and his colleague. The books of the company were always admirably kept, and therefore there was no difficulty in auditing them. He considered that, for the small time the company had been in existence, it was a very successful one indeed.

The proceedings then terminated.

NEATH NEW GAS COMPANY.

A General Meeting of the Shareholders of this Company was held at the Town-hall, Neath, on Monday, the 27th ult.—Mr. SANKEY GARDNER in the chair.

The CHAIRMAN, in opening the proceedings, said that the meeting had been called to make the shareholders acquainted with the proceedings of the company up to the present time, and he would presently call upon the secretary (Mr. Dore) to read the report of the directors, which report, he thought, the shareholders would find to be very satisfactory. He could have wished a larger attendance, but it often happened in affairs of this kind that people were indifferent, and left the work to be done by a few. It was, however, perhaps necessary that on this occasion there should have been a good attendance, because the greater part of their work had been accomplished. He thought that their position now was safe—safer, at all events, than it had ever been, because the work of the directors had been completed. They had obtained as it were all but the possession of the works. They had met together that day and expected to get counsel from the shareholders, and their support to take possession of the works. Then any difficulties which might appear would be readily surmounted. He would mention that that morning nearly £1000 had been subscribed by the gentlemen he now saw around him, who had met before during the day. He thought that out of the shares first issued there were remaining some 200 unallotted, and about 92 had been subscribed for that morning by some of the gentlemen present. He now asked the shareholders to take up the remaining shares of that number, amounting to about 120. When these shares were taken up, with the first call only paid upon them, they would have complied with the requirements of the Act of Parliament. As soon as these shares were taken up, they might exercise their borrowing powers to the extent of £2500, and there might be no delay in issuing the next 600 shares. He believed that they were now in a position to obtain £5000 or £6000 by way of loan. He had ascertained that, and he had no doubt that there would be no difficulty in obtaining all the money required; but there should be no delay in taking possession, and he thought they would agree with him in the advisability of this course. He should be very glad to answer any questions from any gentleman present relative to the position of the company. They would now, however, hear the report read by the secretary, and he had no doubt they would look upon it as very amusing.

Dr. RHYS: Are there to be any further parliamentary expenses?

The CHAIRMAN: No; none at all. Now, though the award (£12,180) is greater than we expected, thinking, as we did, that structural value would have been entertained, I think we may be satisfied. Instead of taking structural value, the umpire has fixed the price at what the works are worth as a going concern. They wanted for their works 16 years purchase, and it appears, from the accounts submitted to the arbitrator and sworn to by Mr. Davies (and we are bound to believe the accounts), they made £1100 by their works last year, notwithstanding that they had reduced the price of gas from 5*s.* to 4s. 6d. Now, that £1100 is equal to a dividend of 15 per cent. on the shares of the old company. Well, the award has been for £12,180, and I do not think we have any reason to complain, for we have a concern already made for us for £12,180; and there is not any doubt but that we shall double the supply. If we do not, we shall obtain something like 6 or 6½ per cent. if called upon to pay £4000 above the amount of the award. In all works of this kind there is a constant tendency towards an increase of supply; especially will this be so in this town, where the number of houses lighted in proportion to the population is not so great as in other towns. There was scarcely one to ten here, but in other towns there was one to seven, and in others a much larger proportion.

The SECRETARY: One to three in some places.

Mr. MAY: And our own engineer has assured us that the works are in good order.

The CHAIRMAN: And this town is not half lighted. It was mentioned by Mr. Charles this morning that 100 additional lamps would be required. I will now call upon the secretary to read the report.

The SECRETARY then read the directors report, of which the subjoined is an abstract:—

At the arbitration, conducted before Mr. T. N. Kirkham, of the Imperial Gas Company, London, your company was represented by Mr. Michael, as counsel, and by Mr. Thornton Andrews, C.E., Mr. Geo. W. Stevenson, C.E., Mr. Samuel Hughes, C.E., and Mr. Ebenezer Tumnins, as witnesses. No information whatever was afforded to these gentlemen by the old company.

From the evidence of the witnesses called by the old company it would appear that their capital consisted of 214 shares of £45 each, upon which £8730 had been called up, and that the profits of the undertaking during the year ending the 30th of June, 1867, was £1139 11s. 1d. Taking this sum as the basis of his calculation, less interest upon the capital a tenant would require to carry on the business, and a renewal and reproduction fund of 1 per cent. per annum upon the structural value, Mr. Barlow, C.E., estimated the present net value of the company's property as being £16,331, exclusive of the floating stock.

The other witnesses for the new gas company adopted the same mode of valuation, but, in addition to the deductions made by Mr. Barlow, they further made a reduction, representing the capitalized value of the new company's parliamentary engagements. The umpire, after hearing evidence, awarded to the old company the sum of £12,180 as the purchase-money of their property.

Your directors conceive that they may fairly congratulate the shareholders upon their being so far successful as to obtain an award which grants to the old company £4000 less than they claimed as the value of their property. By this award your directors are advanced an important step nearer to the attainment of the object for which the company was formed—not the least important of which is the exclusive possession and enjoyment of a business of 35 years standing.

Your directors take this opportunity of adverting to an article which has appeared in circulation in the public prints, as to your want of power to use the old company's works, in reply to which statement your attention is directed to the 38th section of the company's special Act of Incorporation, which gives every necessary power for conducting the business, restrained only by the condition that new works must only be built upon the old company's land, or on the site they have already purchased.

In answer to Dr. RHYS,

Mr. MAY said that the maximum charge for gas by the Act was 4s. 2d.

It was suggested that possession of the works should be taken as promptly as possible, since they would naturally deteriorate in value as time passed by, while the other company would, in lieu of the new company, continue to derive the benefit from them.

Many spoke of the enterprise as a good one, and several took additional shares. The tone of the meeting was good, and, at a private meeting subsequently held, such steps were taken as to ensure the remaining shares being applied for within twenty-four hours.

METROPOLITAN ASSOCIATION OF MEDICAL OFFICERS OF HEALTH.

At the usual Monthly Meeting of the Association in the Scottish Corporation Hall, Crane Court, Fleet Street, on Saturday evening, April 18th—Dr. DRUITT in the chair—the further discussion of Dr. Letheby's paper "On the Cholera Epidemic of 1866 contrasted with former Epidemics of the Disease, and an Examination of the Question whether the Water Supply had any Connexion with the Disease," was resumed by

Mr. HAWKSLEY, who said that all the facts which he had been able to collect tended to show that it could not be true that cholera was propagated from one human being to another by means of the water supplied to a locality. On the last occasion he stated that the epidemic, which was said

to have had its origin in 1817 (though he for one did not believe in the correctness of the date) in the sunderbunds of India, when uninfluenced by obvious disturbing causes, always travelled westward. This was an exceedingly remarkable fact, and it was corroborated by the additional fact that, notwithstanding Australia was within a comparatively short distance of the place where the disease was said to have had its origin, Australia had never been visited by it. On the contrary, it had always passed through central Asia, and down the margins of the Baltic, until it reached England. Leaving the European shores, it travelled to America, and still pursuing its westerly course, crossed that continent, and was finally lost on the Pacific coast. The opinion he had formed as to its origin was that its appearance epidemically was owing to some unknown telluric or cosmical changes. Among other characteristics of the disease it was found that it always took the lower ground first, always passed by the margins of seas and lakes and along the line of rivers, and up rather than down the course of those rivers wherever its normal path could be traced. He said "normal" because wherever there was a very rapid interchange of population it naturally followed that a disease so contagious as cholera should deviate from its course. But invariably, when left to itself, its path was along the coast line, in the first instance, and from thence it ascended the rivers to the interior of the country. When speaking on this subject at the last meeting, he thought he did not make himself so clearly understood as he intended in reference to the path of the cholera on its several visitations of this country. He then stated that, having passed through central Asia and arrived by way of Moscow at St. Petersburg, its journey westward was by Warsaw and Berlin. It would have been more correct to say that its principal path lay along the margin of the Baltic, and that it made its way up the Vistula to Warsaw, and from Stettin up to Berlin. It invariably arrived along the Baltic at Hamburg, and thence reached this country, visiting Hartlepool, Sunderland, or Newcastle by the most direct possible route. It then invaded a great many other places, but still invariably making its way into the interior, up the rivers, and not, as would naturally be supposed, if the excreta theory were correct, visiting first the dirtier towns, and being transmitted by the water going from the higher parts of the country to the lower. On several occasions he had visited Russia, Sweden, Denmark, Prussia, and Italy during the prevalence of the epidemic, or immediately after its disappearance, and in the course of his professional avocations he had had to investigate the causes of the disease, and to ascertain whether it was propagated by what were called "germs" through the medium of the water. All the experience he had had on the subject inclined him to pronounce an opinion decidedly negative to the "germ" theory. As a philosophical fact, it was well known that the matter of disease was remarkably easy of decomposition. There was no decomposing agent more powerful than water, which contained a very large quantity of oxygen, and that oxygen was exactly in the state in which it could most readily decompose all matters of the kind diffused through it. The propagation of cholera, so far as it could be said to be propagated from one person to another, was more easily propagated by means of the lungs than by means of the stomach. Everything taken into the stomach was decomposed—changed in character; and medical men knew how difficult it was in that way to introduce zymotic disease. It was apparent that, if a human being made 20,000 respirations a day, and every one of those respirations caused the inhalation of at least 15 or 20 cubic inches of air, which air was charged with morbific matter, which was thus presented to the finest of cellular substances, there could be no difficulty in accounting for the propagation of disease in the system by means of the lungs. But there were some other remarkable features of this disease—features which did not perhaps distinguish it from some other diseases, but inasmuch as this one had been made "the horror of the day" it might be well to notice. It was found that, while cholera took a particular path and settled down upon some particular town, the next town, or the next half dozen towns, did not suffer from it at all. That the supply of water could have nothing to do in accounting for this circumstance was evident from the fact that some of the towns visited were supplied with water from deep wells, or by gravitation from distant mountainous districts, free from any suspicion of contamination. But whether thus supplied or from sources in the immediate neighbourhood, in no case had he been able to discover any difference in the nature, progress, or virulence of the attack. As a hydraulic engineer, frequently called in during such visitations for advice, he had never been able to trace any connexion between the epidemic and the quality of the water supplied to the infected town. He was not prepared to go so far as to say that water might not be polluted. In the case of a well near a cesspool, the process of oxidation might not obtain at all, or might obtain very imperfectly. There the morbific matter would be presented in an unchanged state, and no doubt that would be very bad indeed in its effects; but he believed there was no instance known in which, upon a scrutiny of facts, it could be established that the water supplied to a town, no matter how bad that water might be according to the received notions —very discoloured, very dirty, very imperfectly filtered—and though it might contain a considerable quantity of vegetable and animal organisms, had been the means of propagating cholera, or had any influence upon it in the least degree, any further than this, that as in other diseases, but particularly in zymotic diseases, filth and impurity tended to intensify it. In the east of London a sort of inquiry had been made into the circumstances attending the recent outbreak. That inquiry was, no doubt, ably conducted in a certain sense, but he was sure that to any person who had read the papers published the impression could not be conveyed that that inquiry was judicially and logically conducted, and in a manner calculated to elicit the causes and mode of the propagation of the disease. On the contrary, those papers showed that there was a predisposition to a particular conclusion, and that that conclusion was worked out not in accordance with facts, but in spite of facts. Nothing could be clearer than that that disease was localized in that particular way in which cholera always had been and would be localized, and that the supply of water to the district had nothing whatever to do with it. Upon this point the case of Birmingham was most conclusive. When the cholera raged intensely, in 1849, over all the watershed of the river Tame, above the town, there was but a single instance of the disease in Birmingham, and that was an imported case; and yet Birmingham was then supplied with water entirely from the Tame, into which a considerable portion of the excreta of the surrounding district, containing a population exceeding 300,000, must have been discharged. Take a case of an opposite kind—the remarkable case of Newcastle-on-Tyne, in 1854. The water for the supply of the town was brought from considerably above Newcastle. No doubt at the time it was impure, but not impure in the sense of being infected with cholera matter, for the disease was not up the river, but at many miles below the source of supply. The disease was very bad, and an attempt was made to trace it to the water, but it failed, for the water was the same as it had been in many other years. Then, again, there was no reason for supposing that the cholera matter was disseminated by the atmosphere, because its path was always against the most generally prevailing wind; but there was no doubt that when the disease was rife the atmosphere could convey it. At Copenhagen, in 1853 or 1854, the disease assumed a most intensified form. In the middle of the city there was a hospital for the poor, which at that time contained about 1100 people, of whom rather more than 300 were carried off by the disease; and this remarkable fact was observed, that whichever way the wind blew from that hospital the cholera made a sort of lane down the town. The population of Copenhagen was then about 130,000, of whom some 35,000 went out and camped in the fields. Scarcely any of those persons suffered from the disease, while among those who remained the disease was so fatal that 4050 people died within a very limited time.

Sir CHARLES FOX said he was there at the time, and could corroborate the statement.

Mr. HAWKSLEY: There was then an immense deposit of all the filth of the town close to its margin, on a little island called Amager. The stench from that island in hot weather was most dreadful, and it pervaded the whole town; and yet, on the two previous occasions when cholera was very intense in all the other places on the Baltic, Copenhagen, holding communication by sea and land, was not attacked at all. Under all the circumstances attending the visitation of this fearful scourge, he could not help thinking it was a great misfortune that endeavours should be made in a most unphilosophical manner to attribute the cause and propagation of the disease to something exceedingly proximate, and thereby divert the minds of scientific men, and especially the medical profession, from those researches which they might and could better than any others make into the more remote, and certainly the most truly discoverable, causes of this direful malady.

Dr. LEWIS said this was the second time that Newcastle had been cited as conclusive against the water theory. He had an idea that a commission was appointed to inquire into the outbreak of cholera in Newcastle and Gateshead in 1854, and that something like this was given in evidence, that, up to a certain period of the epidemic, the water was drawn from a particular part of the river, and that on a given day the supply was diverted to another source, and that within a certain time afterwards the epidemic abated.

Sir CHARLES FOX, referring to the case of Copenhagen, said that in 1853 or 1854, when cholera was raging deplorably there, the inhabitants of a cottage six miles north of the town, on the eastern side of the island of Zealand, in a beautiful and, as might be considered, healthful position on the sea-coast, were attacked in the morning, and before night the eight persons residing there were dead.

Mr. JABEZ HOGG thought it was somewhat strange that the water theory was so flatly contradicted by the eminent gentlemen who had addressed the association. At the time the theory was originated by Dr. Snow, the evidence seemed to be conclusive that the water had a great deal to do with it. It was impossible to say to what extent the water might become impure, even if supplied in a tolerably good condition through the storing of it in foul and improper receptacles in the houses of the consumers. He need not say that the members of the association would not accept Mr. Hawksley's theory of the non-propagation of cholera through the stomach, because they all knew that beyond a certain point the stomach could not be made to do dirty work—beyond that point it became itself detoriorated. He had no doubt that zymotic diseases were brought about a great deal through the impurity of the water; but it appeared from Mr. Hawksley's observations that they ought not to rely upon this as the means of propagating cholera to the extent it had been thought capable of, and he was inclined to agree with Mr. Hawksley, that they were likely to deceive themselves, and have their attention diverted from more important considerations, by adopting that conclusion. With reference to the fungoid theory, it certainly did seem to him at one time that there was something in it, but having given a large amount of attention to the subject, he was not able to satisfy his mind that they could at all connect the fungi in the air with cholera. Mr. Hawksley had spoken of the large quantity of air passing through the lungs in a day, and to the possibility of disease being engendered by the destructive fungi thus drawn into them. But it was well known that the lungs in health were capable of taking care of themselves, and that though such large quantities of these matters were breathed, there was scarcely an instance in which the origin of disease could be traced to this source. Professor Owen discovered fungi in the lungs of a flamingo 24 hours after death, and he attributed death to that cause; and other observers had attributed a number of diseases to these fungoid growths, though, as he thought, with very little ground for the supposition. One learned professor in Germany attributed the formation of warts to the deposit of fungi on the skin; and Dr. Thomson, examining the lung of a person who had died of phthisis, found a large quantity of fungi, to which he was led to attribute the cause of the disease—but, on closely investigating the case, he came to the conclusion that these fungoid bodies might be *post mortem* appearances, and he gave up the theory. There was one point generally lost sight of in the endeavour to connect these fungoid growths with disease, especially when these fungoid growths were received into the interior of the body. In almost every instance they were produced from spores, and required a nidus or ground to work upon and a certain time for growth. If fluid was passing over those spores it was very doubtful whether they would remain long enough to grow; and for that very reason he was inclined to believe that it was almost impossible for the spores of fungi passing into the stomach to remain a sufficient time to produce a growth which would be destructive to the human constitution. He was quite convinced of this, that if the water theory of the cause of cholera was no longer tangible the fungoid theory was still more unsatisfactory.

Mr. LIDDLE regretted that, while Mr. Hawksley had spoken of the investigation into the cause of cholera at the east end of London by most eminent men as unphilosophical, he had himself advanced no theory to account for the disease. He had spoken of atmospheric or telluric changes, which words meant nothing at all, and yet he had found fault with the conclusions arrived at by those who had carefully examined into the subject at the time. They had the fact before them that the disease broke out on the day or the day after the water was proved to be contaminated in the reservoirs of the East London Water Company. If that was merely a coincidence, it certainly was a remarkable coincidence. The mistake appeared to be that, because some persons considered the impure water might have caused the cholera, therefore it was to be taken as the only cause. Now, they all knew that when once the disease had made its appearance it propagated itself. That the disease did not uniformly take the course from east to west, as Mr. Hawksley stated, was proved on the last visitation, when it appeared in London before it reached Paris. There was abundant evidence produced on the recent inquiry to show that the disease was occasioned by drinking bad water. He had himself instanced 14 cases of the kind, and no one reading those cases could entertain any doubt of the correctness of the theory. If further proof were needed, it was furnished by the evidence respecting the prevalence of the epidemic on the south side of London in 1854. There, one of the companies whose district was ravaged by the cholera in 1849 had in the interval changed its source of supply, and at the visitation of 1854 this

district enjoyed a comparative immunity, while the district of the other company, which continued to draw water from the Thames, at the old source of supply, suffered in the same proportion as it had done before.

Dr. WEBSTER thought the water theory had been carried a great deal too far in this country. It might have some influence in producing cholera, but as to its being the sole cause, he could not hold that opinion. He had been to Copenhagen, and was not surprised that cholera found a lodgment there, on account of the bad smells, the low, damp situation of the place, the poverty of a large number of the people, and their addiction to spirit drinking. Nor was he surprised that it prevailed at Ancona, looking at the situation of the town and the mode of living among the inhabitants. The same remark would apply to Genoa, in which there were streets upon which the sun never shone. The theory advanced by Mr. Hawksley as to the mode of travel of the epidemic was frequently contradicted by experience, and the visitation of Spain some years ago might be quoted as an instance, the disease first appearing at Valencia, and afterwards at Barcelona, which was due north.

Dr. EVANS said his experience of the last epidemic at Liverpool would be his apology for saying a few words, although he did not propose to offer any theory as to the origin of the disease. In the great majority of the cases that came under his notice the patients were brought from the beerhouse to the hospital. All the worst cases came from a certain district in the town, in which it was known that filth abounded, and which district, through the exertions of the sanitary inspectors, was thoroughly cleansed, so that ultimately the disease was stamped out. With regard to the spread of the disease, he knew, from his own experience in the Indian marshes, that cholera, which was endemic in Calcutta, spread due south. Mr. Hawksley spoke of water as having a most powerful decomposing action on choleraic matter. He had himself found that heat was the most powerful agent for the purpose. As to the origin of cholera, he believed that heat and moisture would of themselves generate the disease.

Dr. TYLER objected to the water theory, and stated that he was medical attendant at a school in the east of London, containing 160 children, who all drank the water supposed to have been the cause of the outbreak in that district, and there was not a single instance of cholera amongst them.

Dr. THUDDICHUM confessed that, having paid respectful attention to all the speeches he had heard, he could make nothing out of all that had been said. The question before the association was this, whether in 1866, during a particular period when there was an outbreak in Whitechapel, there was a condition of water in the district supplied by a certain company, which justified the opinion that that was the cause of the disease. As far as the evidence went the case was complete; and as far as the objections to the theory were concerned, none of the speakers had dared to grapple with them. The pollution of the water had been proved—the mortality was almost exclusively in that district. But Mr. Hawksley, to whose general learning he paid great respect, but to whose medical skill he took great exception, had attributed cholera to telluric influences or cosmical influences, putting aside altogether the fact of the polluted water. He would advise Mr. Hawksley, before venturing again to offer an opinion on the subject, to study the records of the Board of Health. Those records were so valuable and so certain that one was astonished to find them so neglected. In the year 1849 the first epidemic occurred to which the researches of the Board of Health were directed. It was then proved that two water companies which supplied the south side of London supplied water which stood in a certain relation to the mortality by that disease. In 1854 London was again visited by the epidemic. During the interval the south London companies had changed positions. The worst company in 1849 had gone higher up the river; the other remained as it had been. In 1854 the mortality was very small in the district of the removed company; in the district of the other the mortality remained the same. Now he came to the cardinal point of this discussion. The conclusion to which the Board of Health came from these facts was this—not that the polluted water had caused the cholera—not that the pipes of the water companies had distributed the poison, but that certain filthy water had been distributed, which predisposed the population supplied, to attacks of cholera—that a population which drank foul or polluted water was 3½ times more liable to be wasted by cholera than a population which drank pure water. These figures only referred to the mortality, therefore they must be modified to that extent. The initiatory cause of cholera was cholera itself. Cholera could be carried from one person to another by choleraic matter, but only when it became putrid—*i. e.*, from the fourth to the fourteenth day—could cholera be propagated by the evacuations. It could not be proved that cholera was propagated by water, but that it might be, could not be denied. Hence, as sanitary officers, the members of this association had a duty to perform in the face of all the objurgations of civil engineers and water companies, and that was not to allow any impure water to be distributed to the public.

The CHAIRMAN wished, before Dr. Letheby replied, to correct a little laxity of definition as to what had been called the path of the cholera. The propagation of cholera merely meant the movement of diseased men and their secretions, and the rate of propagation, therefore, must vary with the variation in the speed as well as in the direction of travel. Whether the water theory were correct or not—and he could not help assenting to its probability—he regarded it as of secondary importance to the conclusion to which, on grounds of public utility, he was compelled to come—viz., that if cholera could be propagated by water the water companies could not be trusted without some controlling power to preserve them from it. With regard to the investigations in the east of London, he thought the gentlemen engaged upon it performed a great public service, which ought not to be lost sight of.

Mr. HAWKSLEY observed that, having spoken, he had no right to address the meeting again, but, to prevent misapprehension, he begged to observe that the course of traffic and intercommunication was quite as much towards the east as it was from the east, and yet that the path of epidemic cholera, viewed on the great scale, was always westwardly.

Dr. LETHEBY said the object he had in view in reading his paper before the association was to gather the experience of those who, living in the heart of the cholera district, had had better opportunities, from their local knowledge of becoming acquainted with the facts of the case, than those who sat down at their desks and drew all their experience as to the habits of cholera from an investigation of maps. It seemed to him that the theory of the connexion of the East London Company's water supply with the cholera arose from the circumstance that the disease localized itself in that company's district. If there had been another notion abroad, and it had been supposed that there was some connexion between the propagation of cholera and the supply of gas, there would have been the same coincidence of facts with regard to the Commercial Gas Company as there was with the East London Water Company. The confines of the cholera epidemic were, so to speak, the confines of the Commercial Gas Company, and if anything could have justified the conclusion, there was ample evidence (collected in the same manner) that the gas they supplied was connected with the cause and distribution of the disease. There was also this additional fact, that many cholera cases were at the Commercial Company's works, and this, no doubt, would have been regarded as strong confirmatory evidence of the correctness of the theory. He made these remarks to show that in the examination of this question persons had been guided by a set of coincidences which to his mind were nothing but coincidences; that they had not gone logically and philosophically and fairly into this question, but had jumped to a conclusion, the consequence of which was that the progress of inquiry into the facts had been arrested from the belief that the sum total of human knowledge on the subject had been exhausted, and that there was no need for further inquiry. With regard to the question which had been submitted to the association—viz., the connexion of the East London Company's water with the propagation of cholera in that district—he had heard nothing in the course of the discussion, either from those who had a knowledge of the locality in which the disease existed, or from those who had not that knowledge, in support of the assertion that any such connexion existed. He had had no answer to the pertinent question he put—take it that the water was polluted, and that on a certain day it was distributed over a certain area, why was it that in certain portions of that district there was not a single case of cholera? Moreover, in St. George's-in-the-East and the Whitechapel district, and in the eastern district of the City, it was doubtful whether this polluted water ever reached the inhabitants. This fact alone showed that a very hasty conclusion had been arrived at. Upon the last visitation, as in former visitations, there had been but one fact which had presented itself to their minds in connexion with the disease—that the cholera occupied low-lying districts, and was connected with filth and poverty, and intemperance. But so capricious was the disease, that while at one time it was found with filth, at another it was found in the homes of the wealthy; sometimes where the supply of water was pure, at others where it was impure. With regard to the statement made by Dr. Thuddichum, that upon a change of the source of supply by one of the South London companies from the lower to the upper regions of the Thames, they had no cholera in their district, where formerly it had been very severe, and that in the district of the other companies, in which no change in the source of supply had been made, the cholera on its second visitation was as severe as before—he (Dr. Letheby) had this to say in reply, that that which appeared to be a body of facts brought forward by the Board of Health, was open to the utmost question. At that very time, as he knew, the engineers of those companies did not know their own mains. There was such a network of the mains of the two companies, and they were tapped so indiscriminately, that it was impossible to say from which company the supply to any particular set of houses was derived, and the conclusion arrived at by the Board of Health was open to the gravest doubts. Dr. Thuddichum strongly urged him to study the writings of the Board of Health; but, in candour, he was bound to say that he often looked with considerable doubt upon the conclusions emanating from that body. Their investigations were generally conducted in such a spirit and after such a manner that certain conclusions must be maintained or supported, and therefore he accepted with great hesitation the conclusions arrived at by those who investigated these matters for the Board of Health. In conclusion, he remarked that there had been no answer whatever given to the proposition he had placed upon his paper, and which seemed to show that there was no connexion whatever between the distribution of water by the East London Company, and the existence of cholera in that district. He desired to speak with great respect of Mr. Radcliffe, whose reports, particularly with regard to the progress of cholera in this country and on the Continent, he had read with care and attention, and he considered that that gentleman was entitled to the thanks of the medical profession for the manner in which he had investigated the facts. But in this particular instance he was afraid that the conclusion was formed before the investigation began, and that it was come to simply from the fact that the map of London, had been taken by the Registrar-General, and the outlines of the cholera field marked upon it. There had been floating in the minds of certain people for some time previously the idea of a possible connexion between the character of the water supply, and the existence of cholera, and finding the coincidence of the two facts—that cholera was in the district, and that the East London Company supplied water in the district, there was the conclusion that the one stood in relation to the other as cause and effect. But he repeated that all those who had had the opportunity of studying the disease at the east end of London—with one exception only, in the case of his friend Mr. Liddle—were prepared to state, as their deliberate and firm conviction, from an examination of the facts which had come personally under their own observation, and moreover guided by their great local knowledge of those places, that there was no connexion whatever between the water supply and the existence of cholera there.

Mr. HAWKSLEY asked whether Dr. Letheby could explain how it was, if cholera was conveyed solely by human intercourse in the manner suggested, that it required, in the ordinary course of things, two or three years to travel from India westward to this country, inasmuch as the stream of traffic was the same in one direction as it was in the other, and yet never carried the cholera eastward from Europe to India.

Dr. LETHEBY said it was a question which it was impossible for him to answer, and he would say again that there was so much mystery connected with the subject of cholera that it did not become any one to form a final opinion respecting it. He must candidly admit, with respect to the question raised by Mr. Hogg, that he had had the conviction in his mind that something of a fungoid character was connected with the disease, but the statements of Mr. Hogg had raised great doubts in his mind, and he thought the subject required further investigation. In the present state of knowledge it was manifest that no one was justified in coming hastily to a conclusion respecting the cause of the disease. The disease on its last visitation had taught them a great deal, and moreover it did this—it had removed from their minds what appeared to be well-grounded opinions respecting it. There was such a difference in the character and progress of the epidemic on the last visitation that previous convictions in relation to it were unsettled, but, notwithstanding all it had taught, it had still left them in that condition that no one was justified in forming any opinion as to the cause of cholera, or the manner of its distribution. It was on this ground, and because the question required further investigation, that he had raised his voice against what he believed to be a hasty opinion and belief which would hinder and prevent all candid inquiry. Those who had had the best opportunities of studying the disease supported the assertion that the conclusions arrived at in certain quarters were most hasty and unsatisfactory.

Mr. RADCLIFFE said Dr. Letheby seemed to lay great stress upon the absolute escape of certain districts supplied from Old Ford, and he assumed that the same polluted water delivered on one day was delivered to all parts of the company's district. The evidence of Mr. Greaves was, that a part of

the district on that day was supplied with pure and part with impure water, but he could not state to which part the pure water went.

Dr. LETHEBY said in the course of his inquiries he ascertained that the only places to which Mr. Greaves was certain the impure water was distributed were the places which escaped from the disease.

The discussion then closed.

GAS EXPLOSION AT BERLIN.—A serious gas explosion occurred in the Kurstrasse on the 7th inst., destroying the fronts of a number of houses. Several persons within doors and passing by in the street were killed, and others severely injured. A fire was caused by the explosion, which was not extinguished for two hours.

THE DRY EARTH SYSTEM OF SEWERAGE.—On Monday, the 4th inst., Captain Fishbourne, R.N., read a paper before the health department of the Social Science Association on the dry earth system of sewerage. He first pointed out the great expense incurred in applying the water system of sewerage, and the utter impossibility of preventing the mephitic gases, arising from fermentation and decomposition of the sewerage, from entering the houses, poisoning the air, and bringing disease on all persons who inhale them. The disposal of the sewage in all inland towns poisons the water in our rivers, or where distributed over land, the very sources of our water supply. Professor Voelcker "has repeatedly analyzed the clarified water of sewage after it has undergone the purifying influence of irrigation, and in the majority of instances has found such water though clear and free from smell, almost as unfit for drinking, cooking, and washing purposes as it was in its filthy condition." The dry earth system, as opposed to the water system, is inexpensive; the evacuation is immediately covered with earth, fermentation is prevented, ammonia is fixed and retained by the earth, and no injurious gases or disagreeable ordours whatever are given off to injure the health or annoy any one. The same earth can be used several times, and the author passed round a bottle-full that had been through a closet four times; it was dry, and had no other smell than that of earth. Its value as manure was estimated at from £4 to £6 a ton. The system has been employed with complete success at the Wakefield Prison, Broadmoor Lunatic Asylum, Brighton Barracks, upwards of 50 workhouses, at Halton and other villages, the infirmary at Millbank Prison, Manx Lunatic Asylum, Isle of Man; Elsted Mills, Godalming; Greenbooth Mills, Rochdale; Royal Albert Orphanage, Bagshot; the village of Crawley, Sussex, many other places and hundreds of private houses. In the discussion which followed, Mr. Rawlinson and other engineers defended the water system, without, however, disparaging the earth system. The defects of the former system they ascribed to bad engineering and defective construction. The water-closets and drains ought not to entail expense on the householders, nor need there be any escape of foul air into the houses. It was nevertheless contended by the advocates of the dry earth system, that the closets and drains were a frequent and heavy expense, and the escape of foul air into the houses the rule rather than the exception, especially in the houses of the poorer classes, where it was the constant source of disease.—*British Medical Journal.*

Share List of Metropolitan Gas Companies.

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Price per Share.
	£		£ s. d.	£ s. d.	£
8000	10	Anglo-Romano	10 0 0	10 0 0	11 — 12
5000	20	Bahia (Limited)	20 0 0	3 0 0	14 — 15
1000	20	Do., preference	20 0 0	10 0 0	20 — 22
750	20	Do., do., redeemable	10 0 0	10 0 0	.. — 12½
40000	5	Bombay (Limited)	5 0 0	5 0 0	4¾ — 4¾
10000	5	Do., third issue	3 0 0	5 0 0	2¾ — 2¾
10000	20	British (Limited) (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbge., & Holywell.)	20 0 0	6 0 0	28 — 29
12000	50	*Chartered*	50 0 0	7 0 0	45½ — 46
6000	50	Do.	40 0 0	7 0 0	36 — 36½
10000	20	*City of London*, A shares	20 0 0	9 0 0	21½ — 22
10000	10	Do., B shares	10 0 0	4 0 0	6 — 6¼
9629	10	Do., new shares	10 0 0	9 0 0	11 — 11¼
25000	25	City of Moscow (Limited)	25 0 0	nil.	4½ — 5¼
17490	25	*Commercial*	25 0 0	10 0 0	33 — 34
20000	20	Continental Union	20 0 0	4 0 0	14 — 15
10000	20	Do., preference	20 0 0	7 0 0	20 — 20½
5000	10	*Crystal Palace District*	10 0 0	10 0 0	13¾ — 14
5000	10	Do., preference	10 0 0	6 0 0	12½ — 13
10000	10	Do., new shares	2 10 0	7 0 0	2¾ — 3
4000	50	*Equitable*	50 0 0	10 0 0	64 — 66
4000	25	Do., new shares	25 0 0	10 0 0	32 — 33
23406	10	European (Limited)	10 0 0	10 0 0	13¾ — 14
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	10 0 0	6¾ — 7
20000	10	*Great Central Gas Consumers*	10 0 0	10 0 0	13 — 13¼
5000	10	Hong Kong (Limited)	10 0 0	5 0 0	8 — 10
26000	50	*Imperial*	50 0 0	10 0 0	63 — 64
1300	100	Do., bonds	£100	10 0 0	170 —175
28000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	16 0 0	99 —100
400	100	Imperial Mexican (Limited)	100 0 0	nil.	
200	100	Do., new	100 0 0	nil.	
3000	40	*Independent*	40 0 0	10 0 0	52 — 53
3000	10	Do.	10 0 0	5 0 0	7 — 9
3000	20	Do.	12 10 0	7 10 0	13 — 14
7133	50	*London*	50 0 0	10 0 0	63 — 64
5610	25	Do., 1st preference	25 0 0	6 0 0	26 — 28
503	50	Do., 2nd preference	50 0 0	6 0 0	
214	50	Do., 3rd preference	50 0 0	6 0 0	
£18781		Do., 1st preference stock		6 0 0	
£11828		Do., 2nd preference stock		5 0 0	
12000	5	Malta and Mediterranean (Limited)	5 0 0	4 0 0	3½ — 4
6000	5	Do., preference	5 0 0	7 0 0	.. — 5
30000	5	Oriental (Calcutta)	5 0 0	9 0 0	6½ — 7
30000	5	Do., new shares	1 0 0	9 0 0	1¼ — 1¾
10000	5	Ottoman (Limited)	5 0 0	nil.	1¾ — 2¼
10000	10	Pará (Limited)	10 0 0	6 0 0	8¼ — 9
27000	20	*Phœnix*	20 0 0	10 0 0	26½ — 27
3600	100	Do., new	35 0 0	7 10 0	36 — 37
144000	Sk.	Do.	100 0 0	5 0 0	72 — 73
5000	20	*Rateliff*	20 0 0	10 0 0	21 — 23
	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	23 — 25
6959	5	Singapore (Limited)	5 0 0	3 0 0	
2000	5	Do., preference	5 0 0	7 10 0	
		Shanghai			
4800	50	*South Metropolitan*	50 0 0	10 0 0	70 — 72
	12½	Do., new shares	12 10 0	10 0 0	17½ — 18
15000	10	*Surrey Consumers*	10 0 0	10 0 0	12½ — 13
10000	10	Do., new	6 0 0	10 0 0	7½ — 8
9000	4	United General (Limerick)	4 0 0		2 — 2¼
10000	10	*Victoria Docks*	5 0 0	6 0 0	
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	.. — 10
2989	10	Do.	10 0 0	7 10 0	
316	10	Do.	6 10 0	7 10 0	
1128	10	Do.	3 0 0	7 10 0	
20000	10	Western (Limited) A shares	10 0 0	10 0 0	14 — 14½
10000	10	Do., B shares	6 0 0	10 0 0	8 — 8¼
10000	10	Do., C shares	6 0 0	10 0 0	8 — 8¼
20000	10	Do., D shares	1 0 0	10 0 0	1¾ — 2
8000	5	*West Ham*	5 0 0	7 10 0	.. — 6¼
6000	5	Do., new shares	3 0 0	7 10 0	£2 18s.
551	10	West London Junction (Limited)	10 0 0	6 0 0	
529	10	Do., preference	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	3 12 6	2 12 4½	2 7 6	3 5 0	3 5 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2½ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¼ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1¼ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

Haswells, Nettlesworth Primrose, and South Pelaw	6s. 6d.
Felling, Framwell Gate, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	6 9
Burnhope, Craghead, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hardepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Pearith, Ravensworth Pelaw, Walbridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	15 0
Wigan Cannel (at Liverpool)	17 0

Scotch Cannel:—

Boghead (at Leith)	42 6
Muirkirk	27 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Cowdenbeath	12 0
Losmahago (at Glasgow)	31 6
Ditto (at Granton)	33 6
Arniston	27 6
Wemyss	27 6
Haywood, Wilsontown (at Granton)	23 0
Pirnie, or Methill	17 0
Lothian's Cannel (at Leith)	29 0
Myles' Cannel	23 6
Lochore Parrot (at Burntisland)	28 0
Lanemark (at Glasgow)	16 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

Chatham and Rochester	5s. 3d. to 5 4½
Cork	8s. 6d. to 9 0
Dover, Folkestne, & Ramsgate	5 6
Dublin	9s. to 9 6
Exeter Quay	8 0
Ipswich	4 6
London (from Leith)	8s. to 8 6
London (Pool)	5s. 4½d. to 5 6
Lowestoft and Yarmouth	4 6
Portsmouth & Southampton	7 0
Plymouth	7 6
Shoreham	6 6
Whitstable	6 0
Weymouth	7 0

Foreign.—Per Keel:—

Barcelona	£18 0
Bordeaux	—
Boulogne and Calais	£6 to 6 5
Cadiz	£13 10s. to 14 0
Cronstadt	—
Copenhagen	9 0
Genoa	17 10
Hamburg	7 10
Havre de Grace	7 15
Leghorn	17 0
Lisbon	11 10
Rotterdam	7 0
Stettin	10 0
Trieste	16 0
Venice	19 0

SUNDRIES.

Best Nattle Fire-bks., p. 1000, £2 10s. to £2	15 0
Cliff's Fire-bks. (at Wortley), p. 1000	2 15 6
Ingham's ditto (at Wortley), p. 1000	2 15 0
Fire-clay Retorts, p. ft. run, 5s. 6d. to	0 7 0
Tough Cake Copper, p. ton	81 0 0
English Pig Lead, p. ton	19 7 6
Welsh Bar Iron (in London), p. ton	8 5 0
Foreign Spelter, p. ton	20 5 0
English Block Tin, p. ton	98 0 0
Banca, p. ton	96 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

JOHN VICKARY,

GAS ENGINEER AND CONTRACTOR, IRON AND BRASS FOUNDER,

WORKS—EXE ISLAND, EXETER,

Tenders his best thanks to the various Gas Companies in **England, Ireland, and Wales,** for the very liberal and kind support he has received for the last **22 years,** during which period he has erected and extended above **200 Gas-Works.**

In addition to the numerous towns wherein he has been engaged, he begs reference to the following testimonial:—

Plymouth and Stonehouse Gaslight and Coke Company.

Sir,—I have much pleasure in testifying that the 100-foot Telescope Gasholder and Cast-Iron Tank, erected by you for this Company in 1862, has given the highest satisfaction, and never required the slightest attention or adjustment since its completion.

(Signed) PETER ADAMS, Chairman.

He has also erected a 100-foot Gasholder and Cast-Iron Tank at **Exeter;** an 80-foot Telescope Gasholder and Iron Tank at **Devonport;** a 90-foot at **Torquay,** &c. &c. At either of those works satisfactory references can be made.

He also begs particular attention to his **Improved Gas-Meters,** either **Wet, Dry, or Compensating,** the materials and workmanship of which guaranteed of the very best description, and which has gained for his Meters so excellent a reputation for these last **20 years.**

RETORTS, DIP & ASCENSION PIPES, HYDRAULIC MAIN, CONDENSERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, and GASHOLDERS,

Of any size, and every description of article required in Gas-Works.

Mains, Tees, Connexions, and Syphons, from 2 to 12 in., always in stock, and supplied at Scotch prices.

Clay Retorts and Fire-Goods of every description.

Gas-Fittings of the most modern designs.

Iron Pipe and Fittings, Service Cocks, &c.

Plans, Specifications, and Estimate for the erection of New Gas-Works of any size furnished.

TO CORPORATIONS, GAS ENGINEERS, AND OTHERS.

HENRY ALDER,

GRANGE METER-WORKS, EDINBURGH,

Begs to intimate that he is the ORIGINAL MANUFACTURER of

DRY GAS-METERS IN CAST-IRON CASES.

The Meters are protected by Registration on the 17th of December, 1864, under the "Copyright of Designs Act."

They are much more durable, and at the same time more easily repaired than those in Tin Cases.

PRICE LIST AND TERMS ON APPLICATION.

Agent for Ireland—Mr. J. FURNESS, 3, Fownes Street, DUBLIN.

HENRY ALDER begs to call attention to the following statement:—"In a conversation, held in 1864, with the late "Mr. Adamson, the able Engineer of the Leeds New Gas Company, he pointed out to me the practicability of having "DRY METERS in CAST-IRON CASES. On my return home I worked out the suggestion, and REGISTERED a "METER of this construction on the 17th of December, 1864. Previously to the 31st of March, 1865, I had supplied "Meters in Cast-Iron Cases to Gas-Works in Airdrie, Blackburn, Brighouse, Chorley, Glasgow, Heywood, Huddersfield, "Leeds, Newcastle, North Shields, Rochdale, Rotterdam, Salford, Sunderland, &c. I need hardly inform you, in view of "these facts, that the following Advertisement, to which my attention has just been called, was read by me with feelings of "much astonishment:—'THE ONLY COMPLETE CAST-IRON CASED DRY GAS-METER.—Patented March 31, "1865.—Gas Engineers and others will find that the above Meter is made of the most durable material, also that it can be "repaired at a fraction of the cost of *any other Meter* now manufactured, all the interior fittings, as well as the case, being "fitted together with screws. Drawings explanatory of the above on application. Sole Manufacturers: FULLERTON, "SON, & Co.' I shall not characterize this. It would, however, be esteemed a great favour were you, when opportunity "occurs, to compare the Dry Meter in Cast-Iron Case, registered by me in 1864, with that named in the Advertisement. "You will then be able to determine whether the latter be only an imperfect copy of mine."

DRY GAS-METERS IN CAST-IRON CASES,

MANUFACTURED BY

WILLIAM AND BENJAMIN COWAN,

(ESTABLISHED 1827,)

BUCCLEUCH STREET WORKS, EDINBURGH,

Possess a simplicity of construction and facility for repair greater than any yet produced, while the excellence of the material and workmanship, and accuracy of registration, cannot be surpassed. The superiority of their Dry Meters in Tin Cases is also well known.

SOLE MANUFACTURERS OF

ESSON'S PATENT COMPENSATING GAS-METERS.

COWAN'S PATENT SIDE-VALVE GAS-METERS.

TO GAS ENGINEERS.

WANTED, by the Louth Gaslight Company, a Resident Engineer and Superintendent. No one need apply who cannot give recent satisfactory references as to ability, sobriety, and a thorough practical knowledge of the manufacture of gas, and the repair of the works, mains, fittings, and meters. The party must also write a good hand, and be competent to keep accounts.

Applications to be made, post paid, to Mr. THOMAS FALKNER ALLISON, LOUTH, LINCOLNSHIRE, the Clerk to the Company, from whom further particulars may be obtained.

Louth, April 24, 1868.

WANTED, by the Northampton Gas-light Company, a MAN thoroughly competent to take charge of the fitting and street-main department. He must be a practical fitter, and competent to take charge of the books in his department. Salary £100 per annum.

Application to be made to Mr. JOHN EUNSON, jun., engineer to the company, on or before Monday, May 18.

Northampton, April 22, 1868.

TO GAS COMPANIES.

A Manager of 15 years experience is desirous of a re-engagement in a similar capacity, or as Manager and Secretary.

Address X., Messrs. Marlborough and Co., Ave Maria Lane, LONDON.

TO GAS COMPANIES.

THE Advertiser, who has had many years experience, is desirous to obtain a situation as MANAGER of a country gas-work. He is competent to undertake the entire management of the works, lay mains and services, fix meters, and take indices, &c.; and can have satisfactory testimonials as to ability and integrity.

Address B. T., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as Gas MANAGER, home or abroad, by a steady, honest, and respectable young man, 28 years of age. Has had five years experience as clerk in one of the principal gas offices, and three years in one of the most extensive gas-works in England. Understands retort-setting, &c., can keep accounts, and is able to draw, and can produce first-class testimonials from present employers.

Address W. T. J., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CAPITAL required for the erection or enlargement of GAS-WORKS advanced on favourable terms.

Address Messrs. FIELDING AND CO., Gas Engineers, 8, Marsden Street, MANCHESTER.

WANTED, a good second-hand STATION-METER, for a small country gas-work.

Particulars as to size and price to be forwarded to Mr. E. GODDARD, Gas-Works, IPSWICH.

POPE & PEARSON'S Gas Coal.—We beg to call the attention of all Gas Companies to this important winning, at a depth of 1275 feet. The yield of gas is more than 10,000 cubic feet per ton, with an illuminating power of 20 spermaceti candles, producing 12¼ cwt. of coke per ton. The Coals are now being used by the Gas Companies in London. One Engineer, after trial, gives the following results:—

10,000	cubic feet per ton, and	19·13	candles.
11,468	,, ,,	16·57	,,
12,000	,, ,,	15·42	,,
13,260	,, ,,	15·00	,,

This valuable Coal can be delivered in London within 1s. per ton of the ordinary Newcastle Gas Coal; can be shipped at the ports of Hull and Goole, or by railway to any station.

For further particulars, apply to POPE AND PEARSON, West Riding and Silkstone Collieries, near Leeds, YORKSHIRE.

PATENT Gas-Producing Mixture.—It having come to the subscriber's knowledge that some individuals in Britain have exported to Paris and other continental towns quantities of a Gas-Producing Mixture, known in Britain as "M'Kenzie's or Hamilton's Patent," the subscriber, Mr. B. Hugo Dullens, who holds patents for this invention for France, Belgium, Holland, Italy, Austria, Denmark, and other continental countries, as well as the United States, hereby WARNS all parties against exporting any of said patented material, certifying those who shall do so, that not only will the material be confiscated, but he will proceed against them for such penalties and damages as the law may award to him.

B. HUGO DULLENS, Bieberich, Nassau.
JAMES Y. PULLAR, L.S.C.,
17, Broughton Place, Edinburgh,
Agent for Mr. Dullens.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Rails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street,
LONDON.

BRITISH ASSOCIATION OF GAS MANAGERS.

PRELIMINARY NOTICE.

The FIFTH ANNUAL MEETING of MEMBERS will be held at the Rooms of the Society of Arts, John Street, Adelphi, London, on JUNE 2, 1868, and following days.

The Chair to be taken by THOS. G. BARLOW, Esq., President of the Association.

JAMES BLACKBURN, Hon. Sec.
Gas-Works, Droylsden, near Manchester,
April 24, 1868.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

(Incorporated by Act of Parliament.)

NOTICE is hereby given that the HALF-YEARLY ORDINARY MEETING of the Proprietors of the Imperial Continental Gas Association will be held at the London Tavern, Bishopsgate Street Within, London, on TUESDAY, the 26th inst., at Two o'clock in the afternoon precisely, when a Report will be made to the Proprietors, and a Dividend declared for the half year ending the 31st of December, 1867.

Notice is also hereby given that the Transfer Books of the Association and the Register of Shareholders will be closed on Tuesday, the 12th inst., and will remain closed until after the Half-Yearly Ordinary Meeting on the 26th inst.

By order of the Board of Direction,
ALBERT F. JACKSON, Secretary.
Dated this 2nd day of May, 1868.

FOR SALE.

A Good Hydraulic Centre-Valve, 6-in., for working 3 purifiers. Good as new; only removed to make room for a larger one.

Apply to F. BAILEY, Manager, Gas-Works, EAST RETFORD.

THE Directors of the Shrewsbury Gas Company are desirous of selling Two new PURIFIERS, 10 ft. square, 4 ft. 6 in. deep, with valves and lifting-crane complete.

Full particulars may be obtained of Mr. S. B. DARWIN, Gas-Works, SHREWSBURY.

THE Ipswich Gaslight Company have the following apparatus to DISPOSE OF—

A Cast-Iron TANK WASHER.

A CONDENSER, consisting of 24 8-in. pipes, boxes, and H-pipes, and 3 8-in. rack valves and connexions complete.

A set of Four PURIFIERS, 8 ft. by 8 ft., fitted with Anderson's Four-way Valves.

Also several 8-in. VALVES.

The above are in good order, and (to Companies requiring to enlarge their plant) may be had on advantageous terms.

For particulars, inquire of E. GODDARD, Engineer to the Company.

THE Walsall Improvement Com-missioners are desirous of SELLING a set of Four PURIFIERS, each 8 ft. long, 6 ft. wide, and 3 ft. 5 in. deep, with hydraulic centre-valve, covers and sieves, crane for lifting lids, and connexions complete.

Apply to Mr. CHALLINOR, Manager, Gas-Works, WALSALL.

GASHOLDER FOR SALE.

ONE, 40 ft. diameter and 16 ft. deep; Four, 40 ft. diameter and 13 ft. deep; One, 28 ft. diameter and 8 ft. deep. All quite new.

For particulars apply to THOS. PIGGOTT & SON, Swallow Foundry, Spring Hill, BIRMINGHAM.

FOR SALE, a cast-iron Gas-Tank, 31 ft. diameter by 12½ ft. deep, in good condition. Also two 11 ft. lengths of HYDRAULIC MAINS, 11 in. diameter, with 9 flanged connexions for dip-pipes.

For price and particulars apply to the SECRETARY of the Gas Company, BRIDLINGTON QUAY.

THE Directors of the Southampton Gaslight and Coke Company are desirous of SELLING the following apparatus:—A set of Four PURIFIERS, 10 ft. square, with centre hydraulic valve, covers, and sieves; an Annular CONDENSER of four columns and chambers, with 12-in. connexions; about 120 ft. run of Cast-Iron HYDRAULIC MAIN, D-shape, 14 in. by 12 in., with 75 complete sets of ascension-pipes and mouthpieces.

Full particulars may be obtained of Mr. DURKIN, Manager, Gas-Works, SOUTHAMPTON.

B. CARPENTER'S

IMPROVED

WOOD SIEVES FOR GAS PURIFIERS.

WORKS:

14, JOHN STREET, PENTONVILLE ROAD,
LONDON, N.

The above Sieves are used by the principal Gas Companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

TO ENGINEERS & IRONFOUNDERS.

THE Walsall Improvement Com-missioners are prepared to receive TENDERS for Four Dry-Lime PURIFIERS, with centre-valve, covers, and connexions, in accordance with a plan and specification to be seen at the Commissioners Clerk's Office, Bridge Street, Walsall.

Sealed Tenders, marked "Tender for Purifiers," to be sent to the undersigned on or before May 28.

Further information may be obtained at the Gas-Works, in Wolverhampton Street, Walsall.

The Commissioners do not bind themselves to accept the lowest or any tender.

SAMUEL WILKINSON, Commissioners Clerk.
Walsall, May 7, 1868.

CONTRACT FOR GAS COALS.

TOWN OF DUDLEY GASLIGHT COMPANY.

THE Directors of the above Company invite TENDERS for the supply of 7000 tons of screened GAS COAL, as free from sulphur as possible; also 1000 tons of CANNEL COAL. To be delivered in trucks free at Netherton Station, Great Western Railway, between July 1 next and June 30, 1869. Rates of delivery subject to arrangement. Terms of payment monthly, in cash.

Tenders to be addressed to the SECRETARY, and endorsed "Tender for Gas Coal," on or before the 26th inst.

The Directors do not bind themselves to accept the lowest or any tender.

Gas-Works, Dudley, May 6, 1868.

NELSON LOCAL BOARD GAS-WORKS.

TO GASHOLDER MAKERS.

THE Local Board for the District of Nelson, in the county of Lancaster, are prepared to receive TENDERS for the supply and erection of a Single-Lift GASHOLDER, 80 ft. diameter and 22 ft. deep, and for certain works connected therewith.

Plans and specifications may be seen on application to Mr. John Landless, the Gas Manager, at the Gas-Works, Nelson; and sealed tenders must be sent to him on or before the 27th day of May inst., addressed to "The Chairman of the Gas Committee," and endorsed "Tender for Gasholder."

The Local Board do not bind themselves to accept the lowest or any tender.

By order,
H. W. HARTLEY, Clerk to the Board.
Local Board Office, Nelson, May 2, 1868.

WEARDALE & SHILDON DISTRICT WATER-WORKS COMPANY.

TO CONTRACTORS FOR RESERVOIRS, &c.

THE Directors of the Weardale and Shildon District Water-Works Company are prepared to receive TENDERS for the construction of a large STORAGE RESERVOIR, two lines of Catch-water, and other Works, on Waskerley Moor, in the County of Durham. These Works are situated within half a mile of the Stockton and Darlington Railway.

Drawings and specifications may be inspected, and printed forms of tender may be obtained, at the Offices of Messrs. Thomas and Charles Hawksley, Civil Engineers, 30, Great George Street, Westminster, S.W., and W. Bouch, Esq., North Road, Darlington, on and after Monday, the 4th day of May, and tenders must be delivered at my Office on or before Monday, the 18th day of May.

The Directors do not pledge themselves to accept the lowest or any tender.

By order,
WILLIAM HARDING, Secretary.
Russell Street Buildings, Darlington.
April 20, 1868.

The earth-work may amount to 400,000 cubic yards or more.

Schedules of quantities will be supplied to Contractors at a charge of £2 2s. each copy.

TO TAR DISTILLERS.

THE Bedford Gaslight Company are prepared to receive TENDERS for the purchase of their surplus TAR for One, Two, or Three years. Quantity per annum about 20,000 gallons.

Tenders addressed to the MANAGER, Gas-Works, Bedford, BEDS.

STATION-METER.

THE Directors of the Ashton-under-Lyne Gas Company are prepared to receive TENDERS for the purchase of a STATION-METER, which is being replaced by a larger one. The Meter is in an ornamental case, 9 ft. 6 in. by 8 ft. 6 in., with 10-in. connexions, hydraulic valve, by-pass, &c., and two 10-in. water-valves, capable of passing 20,000 feet per hour, made by West, of Oldham. One of the plates will be removed so that the interior of the Meter can be seen. The Company will take down the Meter, the purchaser to remove it at his own cost.

Tenders to state the price in one sum, addressed to the undersigned, and delivered on Friday, the 16th of May, endorsed "Tender for Purchase of Station-Meter."

The Directors do not bind themselves to accept the highest or any tender.

ISAAC KELSALL, Manager.
Gas Offices, Oldham Road, Ashton-under-Lyne,
April 24, 1868.

OXIDE OF IRON,

We are prepared to supply, on moderate terms,

HYDRATED PEROXIDE OF IRON (BOG OCHRE),

Same quality as supplied by us to several of the most extensive Gas Companies, and which has given satisfaction.

FRANCIS RITCHIE & SONS,
BELFAST.

GAS AND WATER PIPES.

CLARIDGE, NORTH, & CO.,

BILSTON.

TO COAL FACTORS, MERCHANTS, & OTHERS.

THE RYDE GASLIGHT COMPANY,

(Incorporated by Act of Parliament, 1866,)

RYDE, ISLE OF WIGHT.

The Directors are desirous of receiving TENDERS for the supply and delivery of GAS COALS for One year, in accordance with the subjoined Conditions of Contract.

Further information and forms of tender may be obtained on application to the Secretary.

CONDITIONS OF CONTRACT.

1. Each party tendering for the above-named service shall state in his tender the sum per ton for each description of Coal named, inclusive of all charges whatsoever, for which he will be willing to supply and deliver 3500 tons, more or less, of fresh wrought Wearmouth, Lambton, Townley, Pelaw Main, or Waldridge Gas Coal, the Company reserving to themselves the right of selecting either description from time to time, throughout the Contract, weighed on the Company's Weigh-Bridge, at their Works (in the presence of the Contractor, or his agent if required), and delivered *dry, in good condition for the manufacture of gas, properly cleansed from shale, pyrites, and all other impurities, passed over a 3-16th screen*, and properly trimmed, into the Company's stores at the Gas-Works, Ryde.

2. The Contractor shall deliver with every cargo a certificate of quality, signed by the authorized agent of the Colliery from which the Coal was supplied.

3. The Contractor shall pay to the Gas Company the sum of threepence for the use of the Weigh-Bridge, for every ton of Coals weighed, such sum being the customary charge for metage at the port, and repayable to the Contractor by the shipowner or master.

4. The Contract shall be for one whole year, to be computed from the 1st day of July next, during which time the Contractor shall have the exclusive right of supplying all the Coals which the Company may require for the manufacture of their Gas (excepting Cannel and small Household Coals taken from the Town Merchants in exchange for Coke), and the Coals shall be of the best description of their respective kinds, delivered in full and complete cargoes, *in such quantities and at such times* as may be required by the Directors or the Secretary and Manager for the time being of the Company, so that there shall not be less than *eight hundred tons of Coals* in store on the 1st of October next.

5. The Contractor shall not, unless with the consent of the Directors for the time being of the Company in writing, make any sub-contract or sub-contracts, for the supply of the Coals, or any portion thereof, nor assign or underlet the Contract.

6. In the event of the Contractor delaying to supply the Coals in such a manner as to cause the stock of Coals of the Company to fall below the amount they may consider desirable, or of the Coals tendered for supply by the Contractor being in bad condition, or of inferior quality for the manufacture of gas, it shall be lawful for the Directors or the Secretary and Manager for the time being of the Company to refuse accepting the same, and should the Contractor make default in supplying the Coals required of the proper quality, and in sufficient quantity, after three days notice served by leaving the same at his usual place of abode or business, or sending it through the post in a prepaid letter, and posted in such time as to admit of its being delivered in the due course of delivery within the prescribed period for the service thereof, it shall be lawful for the Directors or the Secretary and Manager for the time being of the Company to purchase an equal quantity of Coals to that required to be furnished in accordance with the Contract, and to pay for the same at the market price of the day (at Ryde), and any excess so paid above the Contract price, together with the difference in the value of the Coals for the manufacture of Gas, shall be paid by the Contractor.

7. In case of colliers, pitmen, or other labourers strike, riot, commotion, or other disturbance, in or about the collieries from which the Coals may be required, or in case of any unavoidable accident whatever, which may prevent the due delivery of the said Coals in manner above mentioned, then the Contractor, with the consent of the Directors or Secretary and Manager for the time being of the Company, shall be at liberty to supply Coals from any colliery approved by the said Directors or Secretary and Manager, the price of such Coals not to exceed the price named in this tender.

8. The Contractor shall, if required, enter into a bond, with two eligible sureties, jointly and severally, to be bound under a penalty of Five Hundred Pounds for the due performance of the Contract, according to the foregoing conditions.

9. Payment to be made by bills payable in London and drawn at two months from the date of the delivery of the Coals into the Company's stores at Ryde.

10. The Directors do not bind themselves to accept the lowest or any tender.

11. Sealed tenders to be delivered to the Secretary on or before the 30th day of May inst., endorsed "Tender for Gas Coals."

GEO. GARNETT, Secretary and Manager.
Gas-Works, Ryde, Isle of Wight,
May 1, 1868.

WOLVERHAMPTON RETORT WORKS.

ESTABLISHED **1840.**

JOHN EUNSON AND SON,

GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,

AND FIRE GOODS IN GENERAL,

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Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

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DESIGNS FOR WORKS & MACHINERY *specially adapted for India, China, & South America.*

Drawings and Specifications for improved RETORT SETTINGS.

FRASER'S PATENT RIBBED RETORTS.

These Retorts are now used at more than 60 Gas-Works, and continue to give satisfaction.

The Iron Retort is recommended for great durability. The Clay Ovens and Retorts obtain a more speedy and perfect carbonization of the Coal.

To ensure the excellence of the Brick Ovens and Fire-Clay Retorts, the Patentee has made arrangements with the following makers for their supply:—

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E. BAKER & Co., Stourbridge.
W. COCHRANE CARR, Newcastle-on-Tyne.
W. FRASER, Inverkeithing, N.B.

Full particulars, with illustrated circular, testimonials, and prices, will be forwarded on application to A. C. FRASER, Gas-Works, COLCHESTER.

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GARDEN EDGINGS of various patterns.
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GRATE BACKS in various designs.

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Shipments on the shortest notice.

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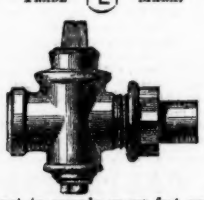
PATENT GALVANIZED IRON COCKS,

WITH WHITE METAL PLUGS.

TRADE (L) MARK.



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CATHELS'S Patent Dry District GOVERNOR is the only perfect self-acting contrivance for regulating the pressures in the higher levels of a district.

CATHELS'S Patent Four-way Disc GAS-VALVE—ONE OF WHICH SERVES AS THREE ORDINARY VALVES—is the best Valve for gas-works.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

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MANUFACTURERS OF

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DWARF GAS-PILLARS—Do., do.
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FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.
BREEZE AND TAR FUEL MACHINE.

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"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan*.

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See Description and Sketch in "JOURNAL OF GAS LIGHTING," March 31, 1868.

MESSRS. WESTWOOD & WRIGHTS are prepared to submit estimates for the supply and erection complete of the above, either in London or the Provinces.

MESSRS. W. & W. have already constructed several, which are now in successful operation, and give great satisfaction.

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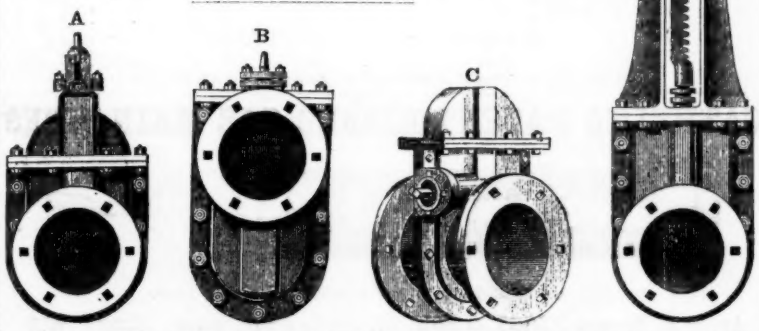
WEDGE GAS-VALVES.



These justly celebrated and well-known Gas-Valves of the most perfect workmanship and construction are made at as low a price as any other kind.

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Gas Companies can be supplied from these Mines with OXIDE of IRON, for the purification of Gas, on reasonable terms, and in any quantity that may be required.

This material is a natural Oxide, and is supplied to Gas Companies as taken from the Mines, without any admixture of deleterious matter. It acts freely, and will purify a much larger quantity of gas per ton, than the generality of the material now in use under this name.

It will be found highly beneficial in large establishments, where they are liable to be called upon occasionally to make a much greater quantity of gas than usual, as well as in small establishments where they are limited in space, as by its adoption a much larger quantity of gas can in much less time be purified with the same quantity of material.

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NO NECESSITY
FOR
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If POPE and PEARSON'S GAS COAL is used.

WEST RIDING AND SILKSTONE COLLIERIES,
NEAR LEEDS.

NINETEEN YEARS PRACTICAL EXPERIENCE.

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Fire-Clay and Iron Retorts, Double and Single Grooved Brick Retorts, of every description.

Bentley's Improved D Brick Segment Retorts, 5 or 3 in one bed.

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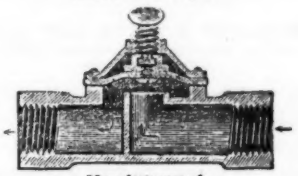
Made to suit every Description of Fittings.
Section of Valve open.



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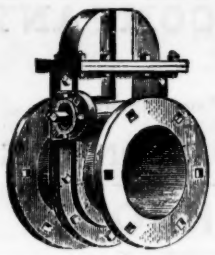

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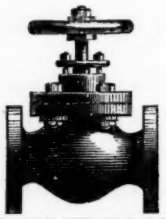
1 ,,	0 8 6
1¼ ,,	0 11 0
1½ ,,	0 14 0
1¾ ,,	0 18 0
2 ,,	1 2 6



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Cost only about 1d. to 2d. per yard more than plain Pipes.
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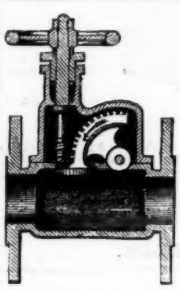

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NEW PATENT

QUADRANT-MOTION SLUICE or GAS VALVE.

It will be seen, by reference to the drawing, that by this simple method a clear water-way is obtained, the disc being drawn by the screw or worm entirely out of the way; thus all the advantages of the ordinary sluice-valve are obtained at much less cost, and the liability to set fast and get out of order entirely obviated. They are adapted for all purposes for hot or cold water, and equally suited for high or low pressure; and in case of need of repair, a new valve-seat can be applied without removing the body or case of the valve.

Particulars of the Quadrant Valve, also of Hydraulic Machinery, High or Low pressure Cocks, Water Closets, Gas-fitting in all its branches, and general Plumbers' Brass work, can be obtained upon application to

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Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

Price 1s. each for Fish-tail Burners.

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Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

*** Further testimonials from Drs. Frankland and Crooks, showing the great practical value of this invention, will be shortly published.

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GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gasfittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

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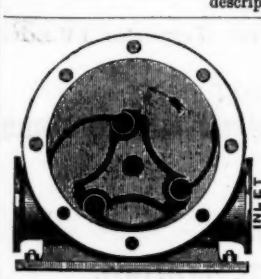
Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gasfittings and Gas Apparatus.



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GAS EXHAUSTER.

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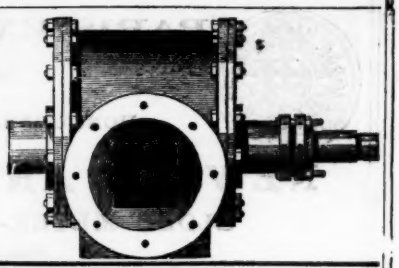

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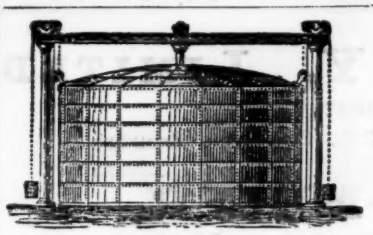

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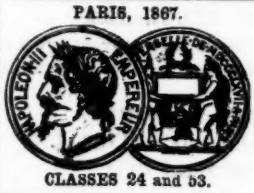

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